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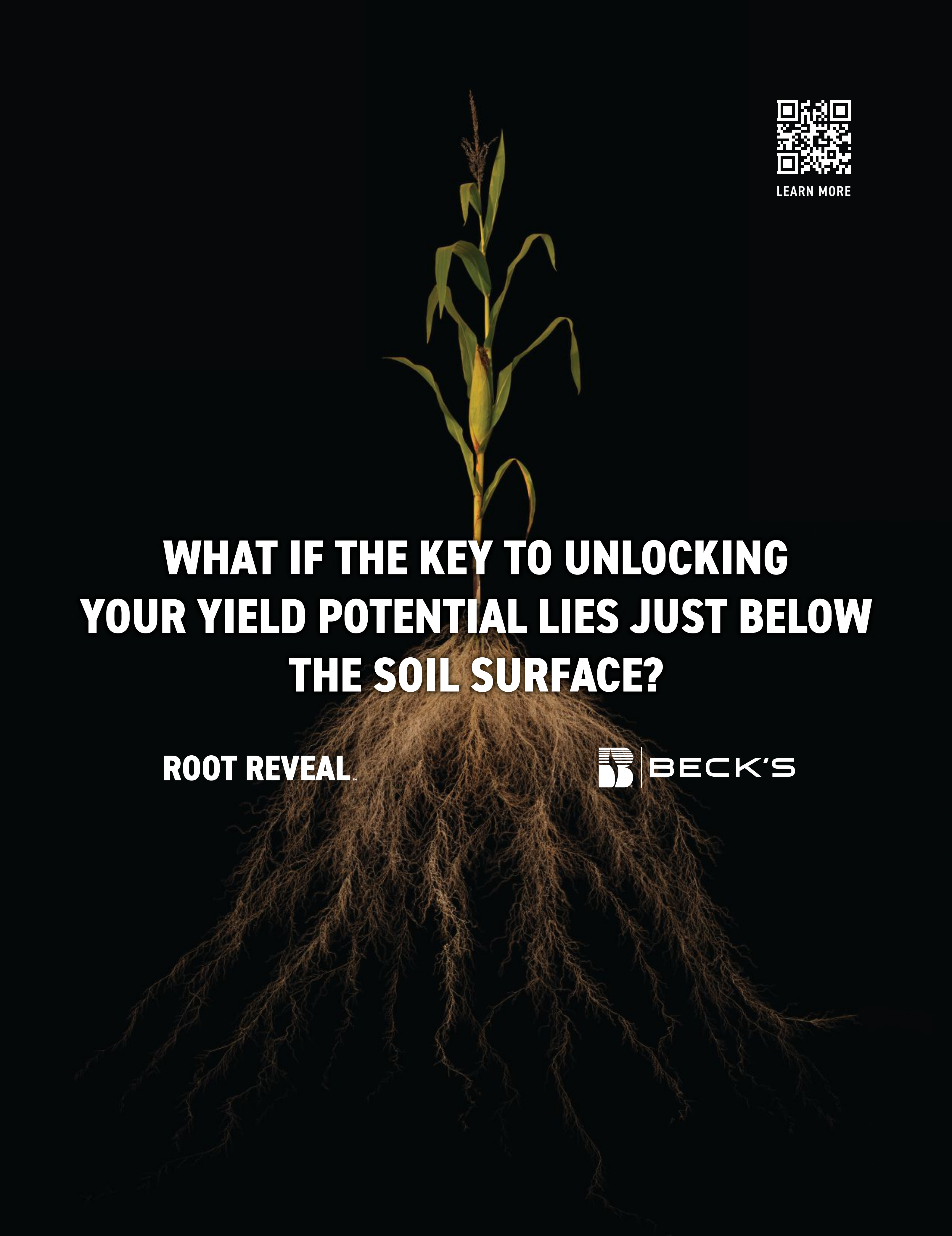
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SEED & WEED GUIDE

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pg. 14

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THE EMERALD ISLE

By Clinton Griffiths

Barley waving in a breeze, a herd of dairy cross calves quietly chewing their cud, the whistle of a farmer calling his border collie off the mountainside, the shrill collision of oyster shells being shaken echoing across an ocean inlet as farmers tend to the beds growing beneath the tide, to marveling at the ability of a weed to thrive in the craggy rock overlooking the Cliffs of Moher. These are just a few of the moments I'll recall in perpetuity as I think of my first farm experiences in Ireland.

In July, I helped chaperone my son and a group of Indiana FFA students on an agricultural tour of the Emerald Isle. We joined like-minded groups from Nebraska and Colorado for a hands-on education about this storied industry.

LABOR OF LOVE

From the conquest of the Normans to the potato famine to today's modern European Union driven model of trade and environmental-minded production, Ireland's agricultural roots run deep.

"Not to be sentimental about it or look through green-tinted glasses, but we still have some of the fabric of traditional farming methods," said Gerry Giggins of Farm Tours Ireland and professional animal nutritionist.

Like Americans, they hold sacred their rich agricultural history and fight tirelessly to preserve their heritage, traditions and family farm DNA. Also, like Americans, the pressure of a global marketplace, soft commodity prices and mandated red tape makes that a never ceasing challenge.

"The regulatory board has something like 250 questions and each answer has to be backed up with small book worth of paperwork," said Cyril Wheelock, a fruit and strawberry grower near Enniscorthy in Wexford. "They don't realize the stress and the pressure that's putting on an ordinary farmer."

It's the same frustrations farmers here often share. Yet not one of the folks we met would willingly step away from the work that they have always loved. Instead, they're searching for ways to vertically integrate, reach consumers, invent private label food products and market to a global economy online, even if it means they end up farming part time or someone in the family has to take an off-farm job.

FINDING A NEW OUTLOOK

Creativity and innovation are creeping across the Irish countryside, draping themselves over the landscape's stone fences and hedgerows, as centuries of tradition gird its cherished agricultural foundations. There are both lessons and tales of caution to be learned here — as well as in many other places around the world. It's why I always encourage those in our industry to step beyond the farm gate whenever possible. Fresh perspectives and a few pristine horizons may await you. FJ

Clinton

__Clinton Griffiths__ is a TV newsman, turned magazine editor, with a passion for good stories. He believes the best life lessons can be found down a dirt road.

PHOTOS: CLINTON GRIFFITHS

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LANCE DOBSON

Lexington, Mo.

After graduating from the University of Missouri in 2011, Lance Dobson returned to his family farming operation in Lexington, Mo. Today the farm utilizes a corn and soybean rotation, but they are looking at ways to diversify. Cattle have been added into the mix following the decision to plant a cereal rye cover crop ahead of soybeans to use as forage. Dobson also started a seed dealership for Beck's Hybrid to diversify his own income.

Q: *Why did you feel a need to diversify?*

A: I think it's important. As human beings, it's much easier to focus on just one thing. Life has a rhythm, and you know what to expect during every part of the year. However, diversification allows you to roll with the punches and grow. As we get out of our comfort zone, it usually leads to good results. Whether it's exercising or farming, hopefully diversification in our day will yield results that improve our longevity. I think we're seeing the need for it right now given the direction our commodity prices are going. So, maybe we need a few more cash avenues or options on the farm.

Q: *Why did you become a seed dealer?*

A: When I first returned to the farm, I didn't have a lot of ownership in the operation. I was mostly just an employee helping with the daily operations. After a few years, I really wanted to take on something of my own. I wanted something I could take hold of and build. I had an opportunity sent my way to start a seed dealership, and so I took it. At that time, we were also going through a downturn in the farm economy, and so it was another way to diversify my cash flow. Since then, it's helped me build a lot of relationships with neighbors and given me the opportunity to figure out how we can all help each other grow our operations.

Q: *What lessons have you learned from diversifying the operation?*

A: Try something new just enough to get a good experiment going so you can see how it could play out on a larger scale, but don't get in over your head. You don't want the test to be so big that it's a real disaster. Right now, it's hard to try new things when financials are already constrained, but find a way to try. It's one of the best ways to find new successes. Yes, there will always be failures, but just go learn from them. I think once you make that jump, you'll be happy you did in the long run. There's so much personal growth that happens when we can try new things.

Q: *What else do you hope to accomplish in the next five to 10 years?*

A: A goal for our farming operation is to be more self reliant and resilient. Today, a lot of the constraints we have are based on commodity prices, which we don't have any control over, and our input prices, which we also don't have any control over. So, if we can build our farm to where we don't rely as much on herbicides, or synthetic fertilizers, I think we'll be in a better place. Similarly, I'd like to build our operation so we don't rely as much on straight commodity prices. Maybe that means we do more direct-marketed goods, or we sell our corn as value added, somehow differentiating what we're growing from commodity yellow corn, I think we'd create a lot more resilient and sustainable business. FJ

PHOTOS: DOBSON FARMS

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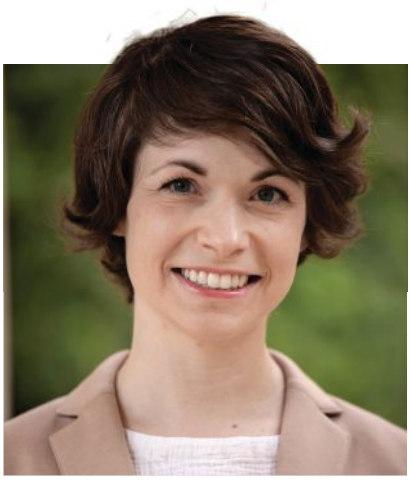

ANNE RUNKEL

PH.D., Vice President of Research & Development, Mosaic Biosciences

Anne Runkel and her team of scientists and engineers are dedicated to developing science-based biological solutions for agriculture. Runkel received her Ph.D. in plant biology at the University of California, Berkeley, contributing to the field of plant cell and molecular biology. She has a long history of conducting research in the field of plant and microbial biology.

Q: *How would you describe your leadership style?*

A: I provide clear direction and the big picture, but my team is really self-directed. Especially in innovation, it's important to have space to be creative and solve problems on their own. That's usually where you find the best solution.

Q: *From a leadership standpoint, what have you learned in your position?*

A: You start with a great idea but what really what ends up differentiating it into something that makes it to market or solves a real problem is working with different people and collaborating. The execution brings the solution to success.

Q: *What strategies do you employ to help bring your team together?*

A: People become close as a team when they work on something hard together, so it helps to find opportunities for them to have ownership and solve things together. That's where I made some of the best connections with my team members. You find the areas where you're strong and where others can fill the gaps.

Q: *What are two of your favorite business tools?*

A: My team is from Spain to Florida to North Carolina, and then we partner with the global Mosaic business, so India and China. The ability to speak to one another on video chat is important. But then the other tools I really like are organizing systems that don't require you necessarily to always have a conversation. You can go and check the status of a project, or update it so that everyone in the business or group that's working on something is contributing to it.

Q: *What's the best advice you've ever received?*

A: I had a mentor who said, "Never say yes – but." You have to be open-minded to opportunities that might not initially seem exciting or might seem problematic in some way. It's important to pause and think about it first. The other piece of advice I've gotten is to be ruthless with your time management. Especially in a leadership position, you're going to have many different directions and opportunities to do lots of things. You need to focus that time or none of it gets finished.

Q: *What advice would you give to someone just getting started in an ag career?*

A: One of the things that was very impactful for me was to be out in the field. Find opportunities to shadow, to help out, to volunteer, wherever you'll meet people who are actually in the space and spend time in the field. For innovation, the biggest breakthroughs are going to be where you're really solving a problem a grower has or retailer has, and it's very difficult to see that if you're not there. **FJ**

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THE UGLY TRUTH

2023 and 2024 will see the largest declines in net farm income ever

By Tyne Morgan

There's a silent stress growing across rural America. Many farmers say they have a gut feeling 2024 will be the worst financial year they've ever had.

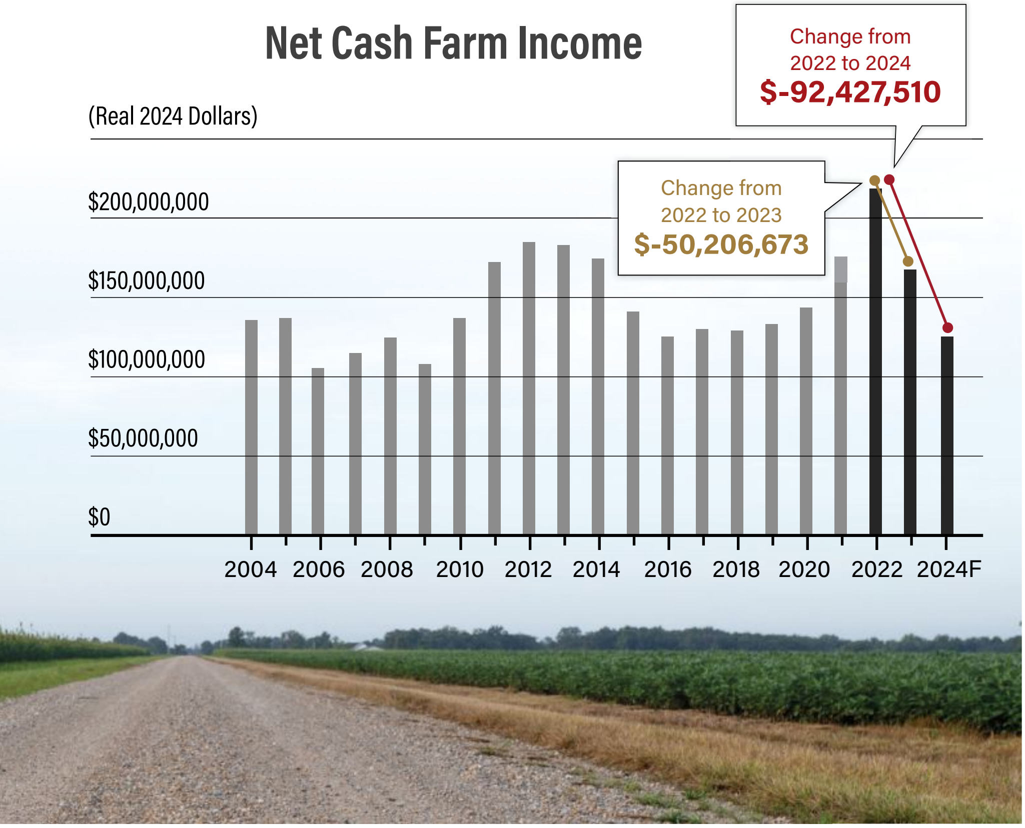
The reality is glaring. USDA's net farm income forecast for 2024 is a 25.5% drop from 2023. What's even more jarring is that follows the 2023 net farm income figure, which saw a 16% drop from 2022.

"The $90-billion drop over a two-year period is certainly the largest dollar value drop, adjusted for inflation, that we've seen in our history," says Ben Brown, an agricultural economist with the University of Missouri. "It exceeds the record set in the mid-1970s."

However, 2023 could end up being even worse than currently projected.

USDA thinks on-farm storage is the highest since the 1980s. The reason: as commodity prices fall, farmers are hesitant to sell below the cost of production.

Farmers aren't just trying to market the current crop – they still have last year's crop sitting in bins, and commodity prices are seeing another bloodbath.



SOURCE: USDA; PHOTO: LORI HAYS

"There just hasn't been a good marketing opportunity," says Arkansas farmer Becton Bell. "It's kind of like catching a falling knife, trying to market soybeans and corn. Nobody wants to catch that falling knife."

Timely rains and heat have helped catapult Bell's corn and soybean crops this year, and he's hoping those extra bushels will help soften the blow of lower commodity prices, but nerves are still high for Bell and others.

STRESS IN FARM FINANCES ALREADY SHOWING UP

Farm financial stress is already showing up in the form of liquidity.

"With rising input costs and lower commodity prices, farmers and ranchers have worked through the liquidity and working capital they built up over the past few years at a more rapid rate than anticipated. Now, they're beginning to leverage equity through refinancing debt," says Tony Hotchkiss, chairman of the Ag and Rural Bankers Committee for the American Bankers Association.

Ag industries, such as equipment manufacturers and other agribusinesses, are struggling as well.

There are some silver linings, says Jim Wiesemeyer, Farm Journal Washington correspondent. He says while ADM's earnings for the second quarter were somber, Juan Luciano, chairman of the board and CEO, expressed confidence in the company's full-year expectations, citing anticipated improvements in crush and ethanol operations. So, despite all the obvious gloom in ag, Wiesemeyer says it's not all doom. FJ

__Tyne Morgan,__ host of "U.S. Farm Report," uses her Missouri roots to cover market-related news and stories.

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SOYBEAN POPULATIONS FALL AS YIELDS CLIMB

By Clinton Griffiths

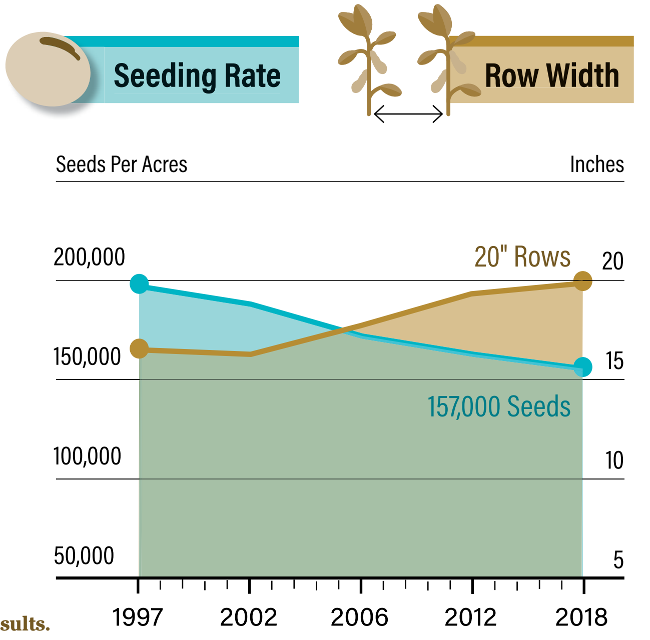
According to the latest numbers from USDA, new technology and high seed costs are driving down seeding rates even as yields climb. From 1997 to 2018, the number of seeds planted per acre fell by 22% on U.S. farms. This is also related to rising row width, which grew from 16" in 2002 to 20" in 2018. In the same time, soybean yields increased 30%.

In 2023, the Farm Journal Test Plots found that in some cases reducing seeding rates could increase profits by $40 per acre, but how much you can reduce soybean populations often depends on mother nature.

"Growers holding all the right cards with regard to their soil, weather conditions, seed quality and weed pressure have advantages that allow them to lower populations more readily than those that don't," says Matt Duesterhaus, a field agronomist with Crop-Tech Consulting based in Illinois.

Farm Journal Test Plots offer seven considerations for determining soybean populations in the future. **FJ**

Scan to read more about the Farm Journal Test Plot soybean results.



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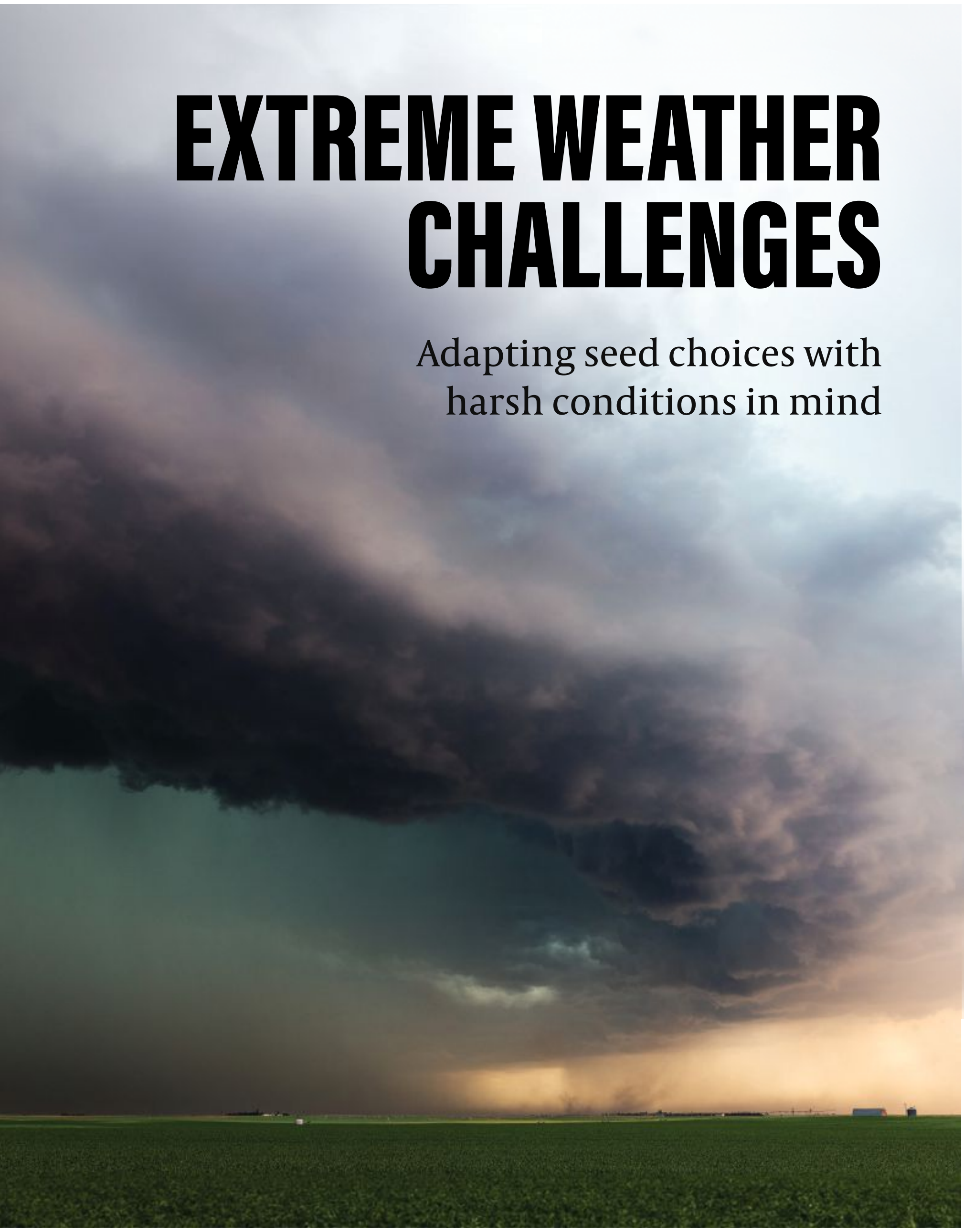

EXTREME WEATHER CHALLENGES

Adapting seed choices with harsh conditions in mind

By Cheyenne Kramer

The 2024 planting and growing season hasn't been one farmers are likely to forget. With each passing week, something new and even more disastrous seemed to be around the corner, ranging from flash flooding and derechos to drought and extreme heat indexes. In the first half of the year, the National Oceanic Atmospheric Administration (NOAA) had tracked 15 separate incidents of extreme weather that totaled over $1 billion in damage. Not too long ago in the 2010s, that was more than the average for the entire year.

Though weather has always been a big challenge for the ag industry, the severity and the damage are growing. Farmers are resilient and constantly prove their ability to adapt, so is there anything they can do to agronomically plan for the unpredictable? Two agronomists weigh in with strategies to decrease risk.

DON'T PUT ALL YOUR EGGS IN ONE BASKET

Eric Wilson, a Wyffels agronomist in southeastern Iowa, says extreme weather is one reason he recommends diversifying your seed selection.

IS SHORT CORN A WEATHER-SMART OPTION?

The extreme wind storms known as derechos have been popping up across the corn belt from Nebraska to Indiana this year. Fred Below, University of Illinois professor of crop physiology, says short-stature corn could provide growers a leg up on these types of conditions.

"I won't tell you short corn won't fall down in a derecho — it will," Below says. "But I guarantee you if you have the tall comparator next to the short one, the short one will go down less."

"There's no such thing as a perfect hybrid," he says. "The best thing against green snap might not be the best thing in terms of a high-yielding corn hybrid. Oftentimes, you have to give something up to get another thing right."

Wilson says he would advise choosing at least three to four different hybrids that each play to a different strength.

"We have a product that does really well. It's high yielding, cranks out bushels, and has a good disease package, but it has a wide green snap window," he explains. "We need to build a package so that in the event one hybrid has a great year, you're able to get in on it, but if we get a bunch of wind, it's not across all of your acres."

He recommends being aware of your seed's weaknesses and adapting your management practices accordingly.

"Maybe the one that's top in yield has an average disease package, but that's OK because you put it on the field you typically spray anyway," Wilson says.

At the same time, he says it's important to not let last year's weather play too strong of a role in your decision.

"Farmers are notorious for suffering from recency bias," Wilson says. "If they have a bad windstorm in 2023, that's all they're thinking about in 2024 – I'm guilty of it myself. We always try and coach toward selecting a package of products that is going to work well regardless of what environment we get for the year."

ACKNOWLEDGE THE FREQUENCY, BUT REJECT THE BIAS

Trey Stephens, Beck's field agronomist in Nebraska, echoes Wilson's caution for changing too many decisions based on one year's conditions.

"You don't want to let one year alter how you do things normally," he says. "Just try to stick to what you know as far as your approach to planting, and control what you can."

At the same time, Stephens says he noticed some weather trends in the area becoming more persistent.

"We're in Nebraska, so there's always been hail and wind, but in the past few years there's been a consistency to it," he says. "The past few years, we've had more severe weather in the later part of June into early July. Then July turns out pretty dry."

Some of the severe conditions Stephens' area experienced this growing season include unusually high levels of hail and rain, sometimes totaling 6" to 10" of precipitation overnight. This led to a significant number of fields needing to be replanted, and farmers in the area experimenting with new hybrids.

"Because of flooding, we had a lot of growers planting shorter maturity corn than they ever have – like 102 to 104 days," he explains. "That was really unique for our area."

Because of adaptations like this one, farmers will walk away from this year more resilient than before. And as Stephens reflects on what happened over the summer, he emphasizes the importance of planning ahead.

"A lot of people who planted early this year had a more established crop that was more likely to withstand some of the extreme events," he says. "I advise growers to be prepared when you have the best weather possible and try to plant. Hopefully, you'll get a crop that's established enough to survive." FJ

2 ADDITIONAL ADVANTAGES OF SHORT-STATURE HYBRIDS

1 **Easier in-season application of biologicals or fertilizer.** This would allow for multiple undercover applications during the growing season, meaning poor weather conditions could become less of an issue because the window to apply is wider.

2 **Less energy goes toward growing the corn stalk, meaning more is available for the grain and root system.** "This is a huge physiological advantage," he says. "Normally, I tell you that you'll pay for root in yield, but not with this. This is a freebie."

__Cheyenne Kramer__ is an associate editor for Farm Journal based in central Indiana reporting on ag business, technology and crops.

PHOTOS: ISTOCK, JOELLE OREM, DARRELL SMITH

RISKS AND REWARDS

Farmers are weighing the pros and cons of growing conventional corn

By Rhonda Brooks

As Patrick Shivers talked with his banker in preparation for his 2024 corn crop, the conversation about potential return-on-investment was sobering.

"He said if I make 200-bu. corn, I'd only lose a little money," says Shivers, a fourth-generation farmer from southwest Georgia.

He resolved to learn how to at least break even this year.

"You've either got to make a higher yield, farm more acres or spend less," Shivers says.

"I'm not saying non-GMO is going to take over every acre in the country, but a lot more farmers are interested."

He decided to double down on input costs and try a conventional corn hybrid planted side-by-side with a traited (GMO) hybrid on 110 acres.

Given current commodity prices, he doesn't expect either hybrid to be profitable. Rather, this is a learning opportunity for the future.

"I did the math, and I've got to make 18 more bushels per acre with the traited corn than with the conventional hybrid to break even," Shivers says.

He is sharing his experiences from planting through harvesting both hybrids via YouTube.

MAKING PLANS FOR NEXT SEASON

Like Shivers, Joe Budreau is seeing other farmers trying out conventional corn because of poor commodity prices.

"I'm not saying non-GMO is going to take over every acre in the country, but a lot more farmers are interested in it because of input costs, and they want to know how to manage it successfully," says Budreau, a certified crop adviser for Spectrum Non-GMO Seed.

The percentage of farmers planting conventional corn hybrids this year is a challenge to determine. USDA reports 90% of U.S. corn planted in 2024 was from genetically engineered seed and, specifically, is herbicide tolerant. In addition, 86% of U.S. corn acres planted this year contained an insect-resistant Bt trait.

START WITH RETURN-ON-INVESTMENT

The 2025 seed-buying process is already ramping up in many parts of the country. Melissa Bell, AgReliant Genetics' national agronomy leader, says farmers aren't simply buying the cheapest seed available.

"Farmers want value, but they're still looking at what products best fit their needs on their acres, whether conventional or traited, and that's truly no different than any other year," Bell says.

Ken Ferrie says to start the seed selection process by determining your return on investment for each hybrid.

"On one hand, the decrease in seed costs can be substantial – you can save $30 to $70 upfront going with a conventional hybrid," says Ferrie, Farm Journal Field Agronomist. "But you take a lot of great tools out of the equation with non-GMO seed."

CONSIDER WEED CONTROL

Keep in mind products containing glyphosate and glufosinate cannot be used in conventional cornfields.

"The question I get most often from farmers is, 'How do I control weeds,'" Budreau says. "I tell everyone a good preemergent herbicide with good residual activity on your specific weed issues is a must with non-GMO corn."

Ferrie adds that everyone on your team needs to be on the same page.

Scan to watch Patrick Shivers' "GMO versus Non-GMO" video.

WATCH NOW

"Say you've got 10 Liberty cornfields and three conventional cornfields and the three conventional ones get sprayed with Liberty. You're going to have a problem," he says.

Also consider if your conventional herbicide program will take out resistant weeds, or you might risk adding herbicide-resistant weed seeds to your weed seedbank.

"That might not necessarily hurt corn yields this year, but it's going to make bigger control a headache for you two or three years down the road," Ferrie says.

EVALUATE INSECT PRESSURE

If you don't have heavy European corn borer or corn rootworm pressure, you might be able to forgo the use of a soil insecticide. That's potentially a $30-plus savings per acre.

Budreau says farmers can get good, cost-effective control of corn borer if it's caught early, but that's not the case for any of the corn rootworm species. If you don't know if you have corn rootworm actively feeding on corn, Ferrie advises digging up some plants, washing the roots and evaluating them now.

"If there's been a lot of feeding, that's an indicator you'll likely need to apply a soil insecticide if you plant conventional hybrids next spring," he says.

Ferrie adds that corn rootworm and corn borer numbers tend to rebound in fields planted to conventional corn after about three years, if they've been prevalent in your area before.

Make sure you work out what your plan is in advance of needing to address pests. "What product are you going to use? What's the cost, and who will be able to apply it, and will they be timely?" he asks. "Your contingency plan needs to be thought through now, not when you need to implement it."

MARKET OPPORTUNITIES

Along with potential seed savings, herbicide and insecticide costs, some farmers have access to markets that will pay a premium for non-GMO corn, usually near 30¢ to 60¢ per bushel.

Ferrie cautions if you get a contract for non-GMO corn, you have to deliver a product that, usually, is about 98% pure. You also will likely have some segregation and handling requirements.

To address the purity issue, Ferrie says some farmers will harvest the first 24 rows of their conventional hybrids and have the elevator test them. If you opt to not test upfront, he says it's still important to hold onto a sample of the seed corn you planted so you can run tests later, if needed.

If you haven't used a conventional hybrid before, Budreau says now is the time to ask your sales rep questions.

"Talk soil types, tillage practices, populations, soil topography and yield goals," he advises. "Look at test-plot data. Go see the hybrids in the field, if you can. Ask a lot of pointed questions. A good seedsman will help you get the right hybrid on the right acre." FJ

***Rhonda Brooks** leverages 36 years of experience and farm roots to report on seeds, agronomy and inputs.*

PHOTOS: DARRELL SMITH, PATRICK SHIVERS

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AI in AG

Machine learning helps sort seeds and predict crop needs

By Clinton Griffiths

Locked inside, away from the heat, humidity and buzz of summer cicadas, sits the future of food security. Terabytes of 1's and 0's on hard drives are being mined by artificial intelligence as it searches years of data for patterns and insights useful in seed selection.

“We're using data science to accelerate plant breeding,” says Morrison Jacobs, global commercial data science lead for Crop Sciences at Bayer. “We can leverage years of genetic performance, germplasm performance data, together with the genetic data to accelerate the pipeline and predict the performance of potential products.”

AN ACCELERATED TIMELINE

Jacobs says today, variety selection that used to take five to six years can be done via artificial intelligence (AI) in four to six months.

“We can use machine learning or artificial intelligence to prescribe new possible genetic combinations and anticipate how a new plant variety will perform in thousands of climates and soil conditions, because we've observed them and logged the data,” he says.

“Historically, what we've done is used data to look backward at what has happened, but that doesn't tell you what is going to happen,” says Mike Tweedy of Pattern Ag.

This new AI revolution uses things like soil, climate and genetic data to anticipate outcomes and turn that information into actionable insights.

“Using AI and some of these predictive models, we can bring insights to the grower or an adviser and say, ‘look at this specific practice on this specific field’,” explains Andy Folta, U.S. product marketing manager for Climate FieldView at Bayer. “Farmers want an output for the data they've been collecting for years or decades.”

“One of the models that came up when we were going through BASF's Xarvio platform told us to spray for white mold two weeks ahead of time,” says Cumberland, Iowa, farmer Nick Christensen. “By the time you saw it in the field, you would have needed to spray two weeks prior.”

“It's turning that information into a recommendation without having to go through five years of trial work on farm,” explains Scott Kay, vice president of BASF.

Jacobs says these field-level recommendations work in concert with ongoing research aimed at delivering better results to farmers. Machine learning is now sorting through 2.6 million different compounds matching efficacy to unique proteins in different organisms, be them pests or weeds. It's an approach Bayer is calling CropKey.

> *“We can use AI to anticipate how a new plant variety is going to perform.”*
> *~Morrison Jacobs*

“Think about it as a lock and you're trying to find the key,” Jacobs describes. “Today our scientists can design entirely new and precise keys using virtual screening, which increases the number of molecules we can analyze exponentially.”

It's how they discovered Icafolin, a new crop protection mode of action, and the first new postemergent herbicide in 30 years. It's set to be released in Brazil in 2028 before expanding to other countries.

“We now have 30 potential new molecules targeted under investigation, and we're validating 10 more modes of action,” Jacobs says. “AI is powering our discovery pipeline.”

These new data tools will go to work for global farmers using solutions for the future from the future. FJ

***Clinton Griffiths** is a TV newsman, turned magazine editor, with a passion for good stories. He believes the best life lessons can be found down a dirt road.*

PHOTO: CROP SCIENCES AT BAYER; ILLUSTRATION: LORI HAYS

FARMER'S COMMON SENSE + AI = BIG POTENTIAL

Pete Nelson has been experimental farming, venture investing and creating innovation hubs with farmers in the U.S. and Canada since 1997. He is currently co-founder and president of AgLaunch, a nationally recognized farmer-led innovation platform for advancing the next generation of agricultural technologies.

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By Pete Nelson

Using artificial intelligence (AI), as an assistant to answer questions has the potential to increase your impact, but to get there, you must separate potential from unrealistic promises.

At this point, large language models (LLMs) and other machine learning are simply prediction machines based on training neural network models (think hand-held calculator). The prominent LLMs, such as OpenAI, Anthropic, Google and Meta, have used public information to build continual feedback loops and predict the next word in a sentence, the next action based on a question or how to reorganize information. They're highly dependent on public information and detailed instructions. Like a calculator, you won't get the right answer if you don't put in exactly the right query.

> *"Remember the two biggest assets you have in the game of agriculture are your brain and your land."*

ON-FARM APPLICATION

Similar neural networks are being used for agricultural data to suggest everything from market predictions to planting dates. The farm-specific data you use isn't available online today, so it's impossible to build that data into an LLM. These models make assumptions of how the agriculture system works within fixed variables, such as the price of corn yield minus input cost. LLMs don't factor in the ecosystem, market potential, nutrient index, etc., which limits their value. Most importantly, they are not able to think like a farmer.

Remember the two biggest assets you have in the game of agriculture are your brain and your land. A university partner might be able to build a model that helps you predict some components with more accuracy, but it's difficult because so much of the data is common sense and localized.

It is too early to understand how synthetic data and self-training will help the models learn and react to real-world scenarios, so for now they should be viewed as a trusted assistant to your brain.

Here are a couple ways to experiment:

▶ **Download ChatGPT and do a few searches**. I did this by asking, "When should I plant corn in West Tennessee on my no-till field with 4% slope and 60°F soil temp in mid-April after a ½" rain?" I continued to narrow the parameters by telling the model there were 25' trees on the north and east sides of the field, a stream along the south side and that next week there is up to 1" of rain expected, followed by a two-week hot, dry spell. I got a lot of good suggestions, but never the recommendation that I should consider planting soybeans.

▶ **If you're seeking AI-enabled technologies**, find ones that build on a good understanding of how your farm works at a granular level and can answer specific questions. As always, partner with other innovative farmers to share and evaluate new technologies and with startup founders to use AI technologies to their full capability. FJ

Disclaimer: This information is not intended to be a source of investment advice or credit analysis.

FARMERHOOD

HELPING UKRAINE'S FARMERS

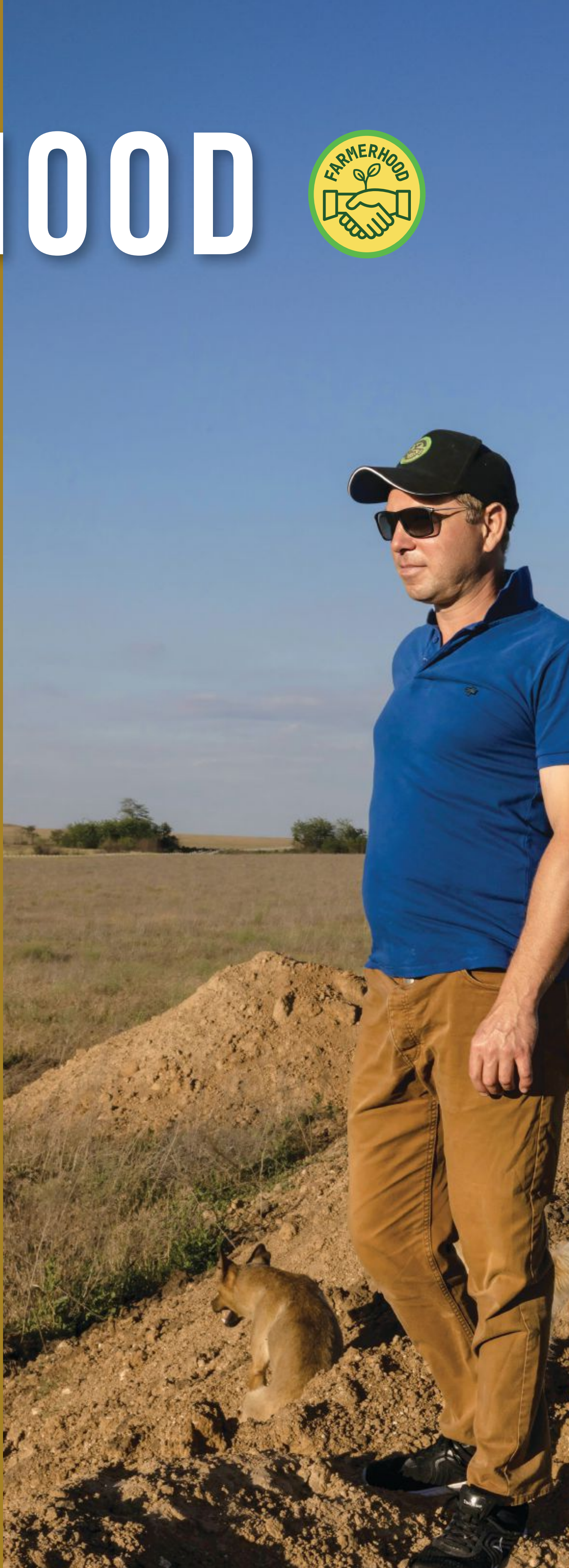
FARMERHOOD is a non-profit organization helping Ukraine's small-scale farmers who have been impacted by the war. Their online platform allows individual farmers, coops, and other organizations to direct their financial support to help Ukrainian farmers maintain their business operations, restore their farms, and support the farm workforce.

With support from the Howard G. Buffett Foundation, Farm Journal Media is publishing a series of first-hand accounts from FARMERHOOD's farmers. These farmers will share their experiences, challenges, and hopes for the future, as they fight to rebuild their lives and livelihoods. We hope these stories will bring to life the atrocities that Ukrainian farmers have faced since February 2022, and we hope their stories inspire American farmers–the most generous in the world–to support their fellow farmers in Ukraine.

This is Olexandre's story.

OLEXANDRE SHERSTYUK

NICHOLAS GARDENS, KHERSON, KHERSON REGION, UKRAINE



Right: Farmer Oleksandre Sherstyuk and his dog Patron stand on top of the anti-tank trenches that have been carved into the landscape of Nicholas Gardens in the Kherson region. In the summer of 2023, brothers Oleksandre and Anton Sherstyuk lost the larger of their two walnut orchards due to a fire caused by a missile. The farm's landscape has changed dramatically since the war started. (Photo: The Howard G. Buffett Foundation/Paula Bronstein)

I've been working on Nicholas Gardens, which was originally owned and operated by our father, since I was 16 years old. When he got sick, my brother Anton and I took over. Our farm operations used to include crop production (wheat, sunflower, barley), berry production (strawberries and raspberries), walnut orchards, as well as livestock, including cows and pigs, but then COVID happened, followed by the war, and it has been increasingly difficult to maintain all of the responsibilities. Right now, our sole focus is crop production.

When the war started, it was hard to grasp what was happening, and even more so, what was to come. Everyone was in a state of panic as we watched convoys of military equipment drive past our farm. It was all so surreal. On February 26th, 2022, our region was occupied, and no one left the house. My family and I hid in our basement, which served as our shelter. We did our best to monitor the situation to know when we needed to hide. There was no light, and no phone or internet service, making this task especially difficult and scary. Many of the residents tried to leave as soon as it was considered safe, including my brother, who wanted to ensure the safety of his five children. I just couldn't throw away everything that we had worked so hard for so many years, so I decided to stay at home to take care of our elderly parents and manage the farm the best I could.

All the farmers who chose to stay on their farms during the occupation continued to work, and I sowed our land whenever possible. We used to have five employees to help on the farm, but once the war started, I was the sole person left, faced with the challenge of managing and operating the farm by myself. I used to love being in the field. There's nothing like driving a tractor and looking at your fields while admiring what you've been able to plant and grow with your two hands. Farming isn't the same these days, and it's a terrible feeling not knowing what to expect the next day. For months, everyone's spirits were so low, but we regained some hope on November 11th, 2022, when the Ukrainian Armed Forces partially freed the Kherson region.

Even though we are no longer under occupation, the Kherson region is still constantly under threat. Our farm lost one of our biggest walnut orchards in the summer of 2023. At the time, a nearby fighter jet flying at a low altitude fired a missile which released a heat trap, resulting in a fire on the property.[1] Typically, when a fire ignites due to shelling, nearby farmers will try to plow the area to keep the flames localized and avoid any spreading. But on this day, there were very strong winds, and the trees were catching fire at lightning speed. What was once our biggest and most productive garden is now a fire pit, overgrown with weeds.

Despite everything we've endured, we have no other option but to continue cultivating the land. I cannot wait for the day when Ukraine will be liberated and we can begin to restore the burned walnut garden; however, this requires a lot of money, and it doesn't make sense to take that risk right now. All our plans have been put on hold.

Regarding assistance, we've received some nitrogen fertilizer from the state, but overall, Ukrainian farmers help the state more than they've helped us, since we're still paying the land leases and taxes, regardless of the circumstances. FARMERHOOD has provided some assistance, which was such a pleasant surprise and gave me hope that I might be able to plan for the future again. Most of our equipment has survived, but everything we have is starting to break down due to neglect. It's very difficult to work with such equipment. We could use a new tractor, and we always need fuel.

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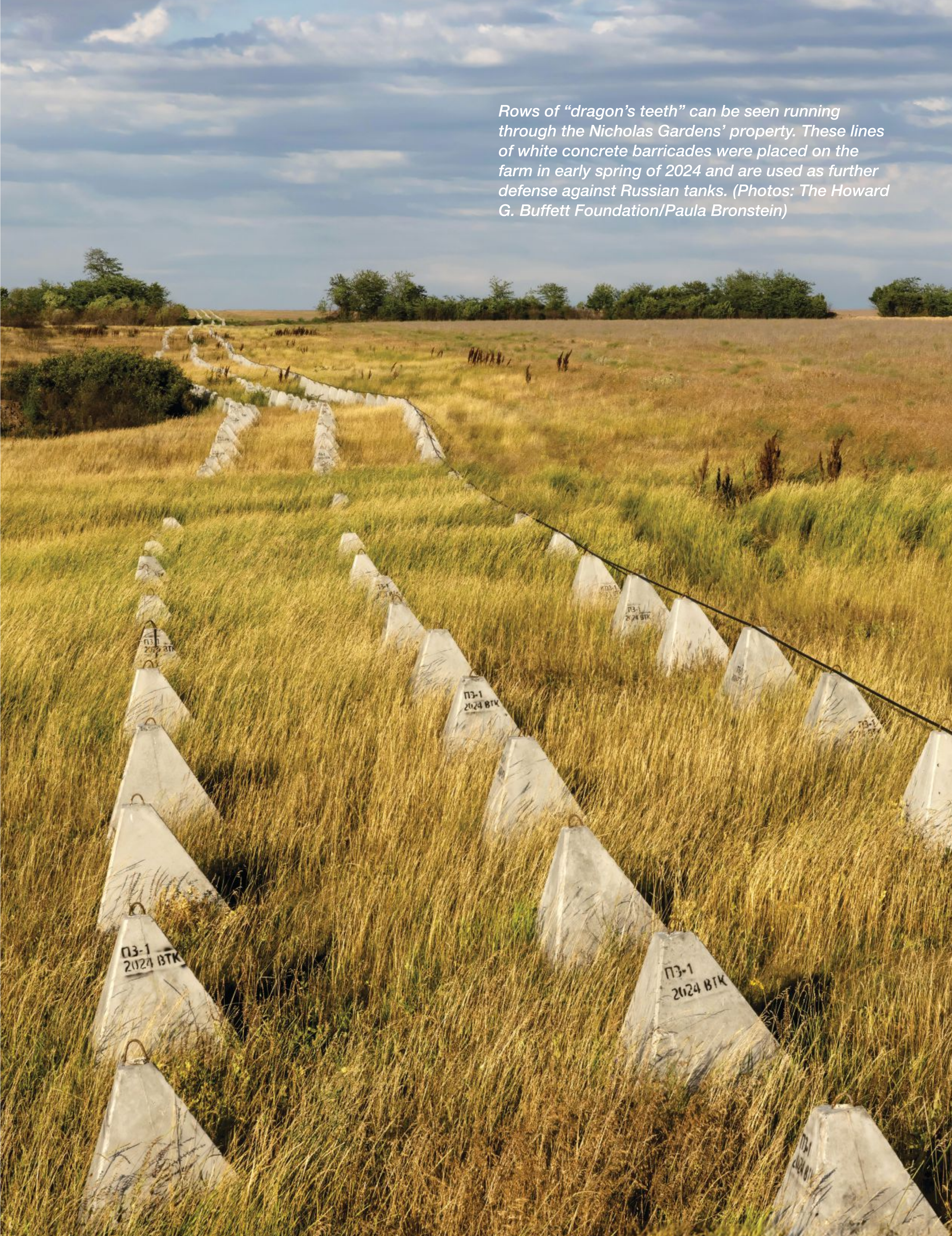
[1] A heat trap is a term for a decoy flare that is released from a missile during flight. These decoy flares are used to counter air defense systems.

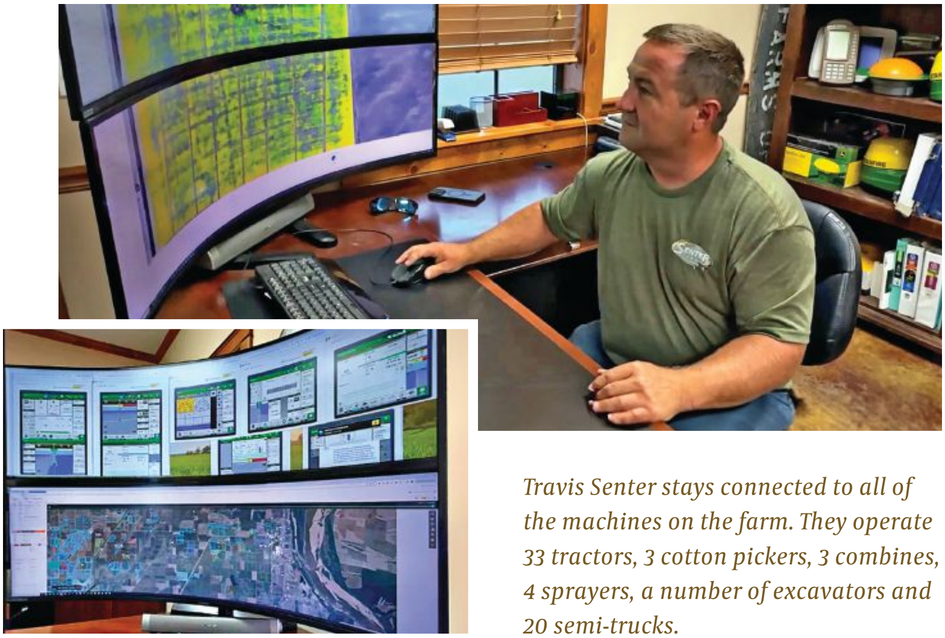


Rows of "dragon's teeth" can be seen running through the Nicholas Gardens' property. These lines of white concrete barricades were placed on the farm in early spring of 2024 and are used as further defense against Russian tanks. (Photos: The Howard G. Buffett Foundation/Paula Bronstein)

RACING TO FARMING

From the race track to the field, Travis Senter's data-driven approach is yielding big results in Arkansas

By Tyne Morgan



Travis Senter stays connected to all of the machines on the farm. They operate 33 tractors, 3 cotton pickers, 3 combines, 4 sprayers, a number of excavators and 20 semi-trucks.

Travis Senter, who farms in Keiser, Ark., is always thinking about technology and what's next. For him, big yields start with collecting and recording as much data as possible every time a piece of equipment enters the field.

"I hate not recording data when we're going across the field," he says. "I want to make sure we're recording and getting that information because you don't know when you're going to use it."

That's a lot of data, considering Senter's family, along with a local partner, farm more than 20,000 acres. Senter says it's technology and data that help him manage it effectively and efficiently.

"I've always been interested in computers," Senter says. "Whether it's technology or equipment, I'm always trying to be cutting edge. When autosteer came along and when John Deere introduced the JDLink System, my father was a little bit older, and he couldn't really figure out some of this stuff. So that was sort of my niche to get involved in farming and to really ramp up our technology side of things."

THE GO-TO-GUY FOR TECHNOLOGY

Travis Senter isn't just the technology whisperer on the family farm, he's everybody's go-to guy in the Keiser area for technology. And how he learns and keeps up on the latest tech trends is by simply experimenting.

"It's a lot of trial and error," he admits. "You want to go all in and buy the next greatest thing, but that's not always the best way. I've watched a lot of farmers spend hundreds of thousands of dollars for things that they'll not use two years from now because that company will go bankrupt," he adds. "So, you've got to do your research and try to figure out exactly what works best for you."

When Senter finds something that works, he goes all in. That was the case when he was trying to find a way to stay connected to all of the family's machines on the farm.

"We had one or two units we were swapping from this tractor to that tractor, and so it was kind of a pain," he says. "I finally worked out a deal and thought, 'What if we just get everything connected? Get autosteer on everything, put displays in everything, do recording on everything,' because that makes life a lot easier. You don't have to worry about what's recording here, what's recording there. Just bring it all in."

A BETTER FARMER FROM RACING

Senter has a love for technology, farming and racing.

"In my previous life, I was a race car driver and not only a race car driver, I was also a race car builder," he says.

For 20 years, he traveled across the world, building and driving race cars.

"Data collection in racing is probably done more so than in farming," Senter says. "I had extreme amounts of data on my race car in 2005 to record where I go, where I'm at, all this information

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PHOTOS: MIKE BYERS

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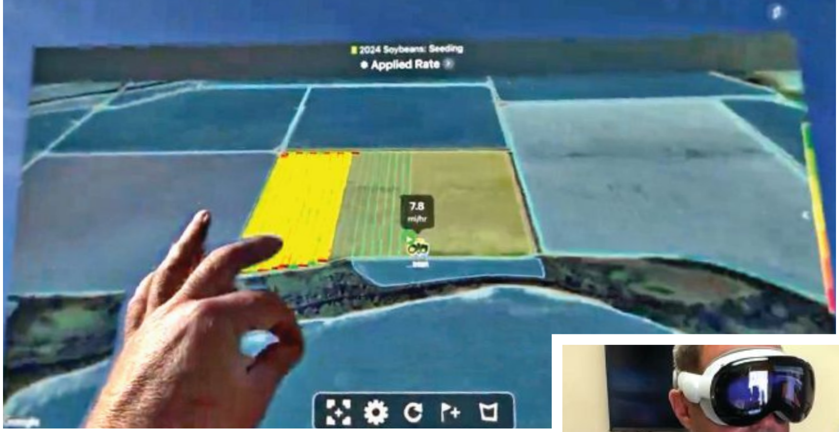

Another tactic Senter is using on the farm is virtual reality. He says he really likes Apple's new VR technology called Apple Vision Pro. He admits that VR headsets are bulky today. But in the future, he thinks the technology will be in a pair of sunglasses.

that I would study. And so that exact thing is what amplified my sensors and my data collection for farming.”

Senter says the ability to collect information in racing is what helped him become a better race car driver. Today, it's making him an even better farmer.

“Building and racing race cars has definitely helped me be a better farmer, which is strange to say,” Senter says.

USING AI AS A FARM TOOL

His time on the track is why he's so willing to try new things on the farm, like artificial intelligence (AI). Last summer, before there was the ability with ChatGPT to add files, Senter and his son created their own AI model. The goal was to take their 10-year yield history in every field, add in planting and harvesting dates, the varieties or hybrids they planted, and combine that information with weather data.

He says AI is a simple way to ask a question that won't be judged.

“I get an answer from ChatGPT, and then I can follow it up with more questions,” Senter says, “and when you think about that, it opens up a whole realm of possibilities.”

Even with those tools, it all goes back to data and capturing as much as possible on every acre and with every pass.

“If I look at a field and see a problem spot, I'll pull out my phone and figure out when we sprayed that and when that spot got missed, so I can come back and fix it,” Senter says. “I then know when the applicator missed it.”

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He says whether it's when he's spraying, planting or harvesting, he looks at the data every night.

“When I get home from work, I'll probably spend two or three hours on a computer going through fields, looking at maps and making sure everything got planted or sprayed right,” Senter says, “and that's usually why I do it.”

In the fall, he says it might be midnight before he gets home, but he always goes through the data to make sure everyone is on the same page.

By calculating every move on his farm, he's controlling what he can control, instead of leaving it up to chance.

“We take every single truck across one scale, just that one scale. We record that information, and I'll enter that in some spreadsheets,” Senter says. “I'll enter all that information every single night after we get done, so I know exactly how much grain is in the field, and then I'll send out a report the next day showing exactly how many acres we harvested, how much grain is in this bin and what their average moisture was. There's lots of information that we try to keep up with.”

A VALUABLE TOOL TODAY

Senter relies heavily on John Deere's Operations Center Mobile app year round. What's new this year is when he pulls into a field to harvest, the app will give him an estimated completion time.

“I kept mentioning to Deere that we really need a way to know that information, just like when you go on a trip and use GPS for your trip, you know your ETA, and you're trying to beat that time of arrival. We try to beat that time to finish harvest,” he says. “The app actually keeps everybody up to date of how much is left in that field.”

With that information, farmers can be more strategic about when they finish a field and move to the next, making sure to miss heavy traffic times, like when school gets out in the afternoon.

From the race track to the farm field, Senter knows the race to farm effectively and efficiently isn't slowing down.

“I'm always learning and finding ways to integrate new things,” he says.

Watch the full feature on Senter and how he thinks about technology on the farm differently. **FJ**

WATCH NOW

Tyne Morgan, *host of “U.S. Farm Report,” uses her Missouri roots to cover market-related news and stories.*

PHOTOS: MIKE BYERS, TRAVIS SENTER

TOP 3 UPDATES TO USDA FARM LOANS

By Cheyenne Kramer

If you're looking to increase your cash flow to purchase inputs this year, the recent changes to USDA's Farm Service Agency (FSA) farm loan programs might be able to help.

The three most notable changes, which go into effect Sept. 25, include:

1 **A new, low-interest installment set-aside program for financially distressed borrowers.** According to Zach Ducheneaux, FSA administrator, this essentially allows eligible, financially distressed borrowers to defer up to one annual loan installment per qualified loan at a reduced rate.

2 **Access to flexible repayment terms.** Some of these more flexible terms include smaller interest-only payments and longer loan terms. The idea behind this change is to allow producers to increase their working capital and give them the ability to save for education and retirement.

Ducheneaux adds though the concern this could add more interest to the loan over time is valid, the point is to increase available cash flow for the operation.

3 **Reduced additional loan security requirements.** This update reduces the collateral requirements for direct loans from requiring available security equal to 150% of the loan amount down to 125%. One of FSA's main goals with this change is to reduce the frequency borrowers use their personal residence as additional collateral for a farm loan.

Additional improvements include streamlining and automating the Farm Loan Program process with a loan assistance tool, online loan application, online repayment feature and a simplified direct loan paper application.

"We think these changes to the terms are really transformative," Ducheneaux says. "Any of these three provisions on their own would be a great transformation, but taken as a collective, this really signals a new day in ag finance, where FSA is going to position itself as the leader and the example for how our friends in the lending community might consider doing this." FJ

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For the first time ever, the Xitavo® seed portfolio will feature new germplasm developed and sold exclusively by BASF. This soybean seed germplasm delivers the genetic diversity needed to reduce risk from the increased climate challenges and disease pressure growers have experienced in recent years.

“We’re excited to not only be launching new products for Xitavo seed, but our exclusive germplasm as well, providing growers with access to new genetics that can help improve their yield by an average of 3.4 bu/A over top competitors,” said Marc Hoobler, U.S. canola and soybean agronomy lead.

Growers know that protecting yield starts with the seed, which is why BASF is expanding its Xitavo® seed portfolio to include 19 new soybean seed products. With these additions, the portfolio includes a total of 46 high-yielding seed products, covering relative maturities of 0.0 to 4.8.

Vaiknoras, Kate. “U.S. Soybean Production Expands Since 2002 as Farmers Adopt New Practices, Technologies.” Soybean Disease Loss Estimates from the United States and Ontario, Canada — 2022. U.S. Department of Agriculture, 26 July 2023, https://www.ers.usda.gov/amber-waves/2023/july/u-s-soybean-production-expands-since-2002-as-farmers-adopt-new-practices-technologies/.

"These new seed products feature specific benefits, including enhanced protection against some of the biggest issues facing growers today," said Hoobler.

For growers facing wet conditions, **XO 2625E** features good tolerance to white mold and iron deficiency chlorosis, while **XO 3375E** features good tolerance to *phytophthora.*

If hot and dry summers are expected, growers may want to consider planting **XO 3105E**, which features above-average tolerance to sudden death syndrome.

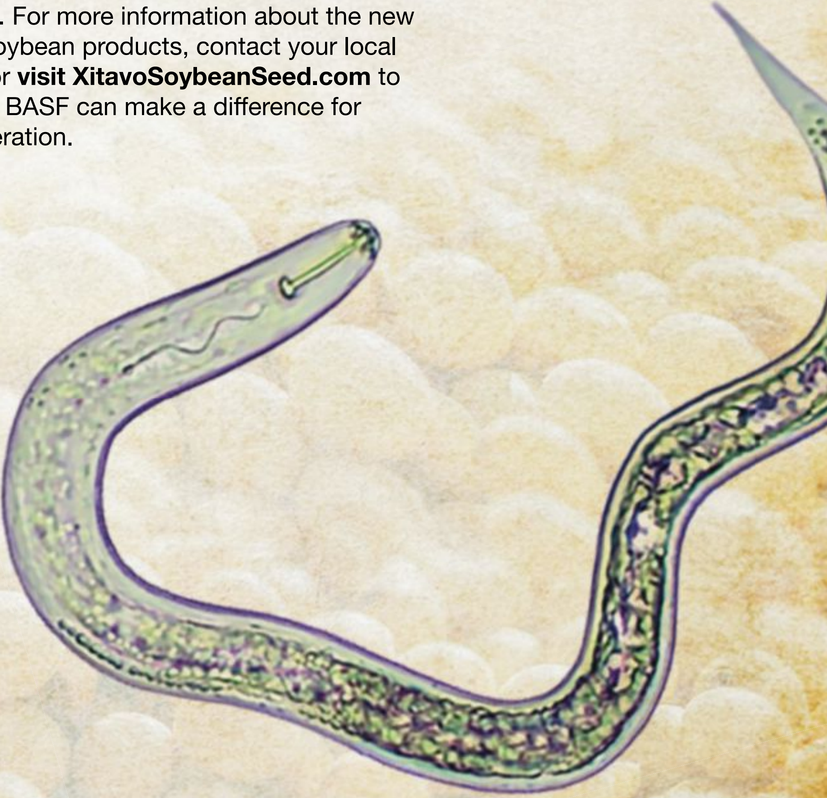
XO 3855E offers a great combination of characteristics, including being a sulfonylurea tolerant soybean *(STS)* and excluder. It has strong standability and a solid disease package, all combined with yield performance at 102.4% of the test mean.

"BASF is one of four companies in the U.S. that are actively developing new germplasm and trait technologies in soybeans, and we know this trait is going to be a game-changer for soybean growers," Hoobler said.

BASF is dedicated to furthering agricultural innovation to help farmers do the Biggest Job on Earth. For more information about the new Xitavo soybean products, contact your local retailer or **visit XitavoSoybeanSeed.com** to see how BASF can make a difference for your operation.

PARTNERS IN THE FIGHT AGAINST SCN

Soybean cyst nematodes (SCN) are the No.1 yield-robbing pests in soybeans in the U.S. With the effectiveness of native SCN traits continuing to decline, growers need a revolutionary tool to protect their seed investment from yield robbers beneath the soil. BASF has worked hard to develop a trait that will effectively help growers combat this problem. Later this decade, BASF will release Nemasphere™, an exclusive nematode resistance trait,. This nematode control trait will be the first and only biotechnology trait for SCN and is one of the biggest innovations in SCN management in over 60 years.



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HOW LOW SHOULD YOU GO?

Agronomists offer five suggestions to help maximize fertilizer ROI for 2025

By Rhonda Brooks and Darrell Smith

As farmers begin to rein in production costs, big ticket items like fertilizer naturally get a lot of scrutiny. Agronomists at this year's Farm Journal Corn and Soybean College say that's understandable, and they want to remind growers to make adjustments based on information and not emotion.

"It's so important that you don't go into panic mode as you make these decisions," says Isaac Ferrie, Crop-Tech Consulting field agronomist. "Thinking through the process now on how to best allocate available dollars for nutrients and other inputs for next season will help you manage through this period."

Here are five takeaways offered during the 2024 Corn College program:

1 Start with the basics. During periods of increased fertilizer prices, it's still important to use soil tests to find current, baseline nutrient levels.

"That gives you the big picture on fertility and what you have to work with in soils, so you aren't just winging it on decisions," Ferrie says.

Also keep in mind the 4Rs: right product, right rate, right time and right placement. Even in these tough times, they are still relevant and valuable.

"Right now, we're concerned about the short-term, but we need to balance that with long-term thinking as well," he adds. "What kind of shape do you want your soils to be in, once we cycle out of these low commodity prices?"

Isaac Ferrie says to consider what shape you want your soils to be in after commodity prices eventually rise.

2 Weigh significant decisions with your agronomic team. This isn't the time to break off working with key agronomists, retailers or other consultants. Retain those you know can help you manage through the year ahead. Talk openly with them about how to accomplish that.

"Stayed dialed in with the ones who have partnered with you in better financial times. Continue to harness their knowledge and weigh their insights on fertility decisions," Ferrie says.

3 Know your margins. Having a handle on your budgets and expenses is going to become more important than ever moving forward.

"Do you know what you plan to spend on fertilizer this fall?" Ferrie asks. "What have you budgeted, or is there a price point you need to be at to make your budgets work for 2025? That's helpful information to share with your retailer and agronomist."

The easiest route to make room in the budget could be making a blanket cut in fertilizer across all acres, but that won't necessarily deliver the best outcomes.

"If you have a dollar amount budgeted

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PHOTOS: DARRELL SMITH, MARGY ECKELKAMP

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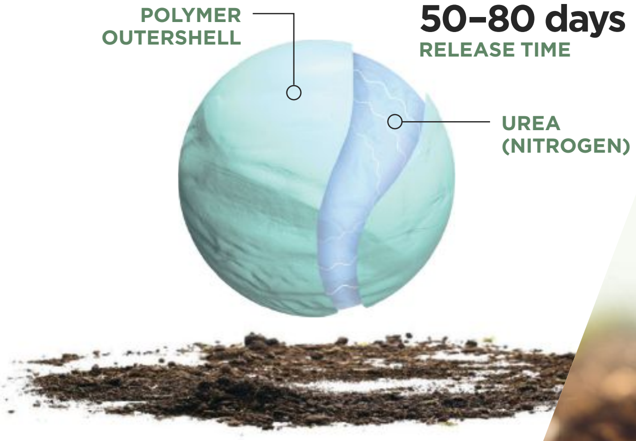

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for fertility, look at how to use those dollars most effectively by field or group of fields. There are likely some fields that offer a bigger ROI than others, for the dollars invested, because of the soil type, current fertility levels and moisture-holding capacity, for example," says Matt Duesterhaus, Crop-Tech Consulting research agronomist.

"Do you know what you plan to spend on fertilizer this fall? *That's helpful information to share with your retailer and agronomist."* **~Isaac Ferrie**

4 **Evaluate soil pH.** Farmers tend to focus on addressing the macronutrients nitrogen (N), phosphorus (P) and potassium (K), but Ferrie says the first thing to consider is soil pH.

Keeping soil pH at adequate levels makes macronutrients and micronutrients more available to crops, boosts herbicide effectiveness, promotes populations of soil microorganisms and improves soil structure.

"Soil pH drives everything else in the field nutrient-wise," Ferrie says. "You want to keep it around neutral for optimum performance and avoid having a soil pH that's too acidic or basic."

Soil pH should generally range from 6.0 to 6.8 in mineral soils, but bear in mind different field crops can require different soil pH levels for optimum performance, adds Ohio State Extension.

Depending on your soil pH, your fields might require a lime application. If your retailer doesn't mention checking soil pH in your fields, be sure to ask about it.

5 **Maximize fertilizer efficiencies.** Depending on your farming practices, here are some ways to get the most ROI, based on 4R principles, with your fertility program in 2025:

▶ **Count starter fertilizer as part of your total application** not an addition.

▶ **Broadcasting nitrogen or sulfur as a herbicide carrier** makes better use of an existing application and helps save on application fees. Also, banding fertilizer with the planter uses an existing application and can more efficiently manage the carbon penalty early in the season.

"You'll see a bigger response to 30 lb. of nitrogen per acre applied with the planter than to 60 lb. per acre broadcast," says Ken Ferrie, Farm Journal Field Agronomist, citing on-farm studies.

▶ **Apply a higher rate of starter if you're dealing with cover crop** or continuous corn residue to compensate for the greater carbon penalty. Following a dry fall, remember you will have more residue and a higher carbon penalty the following spring.

▶ **Some incentive programs pay growers to reduce their nitrogen rate.** Before enrolling, put out test plots to measure the effect. If you do reduce your total nitrogen rate, split your application to become more efficient. Test soil for nitrate at sidedressing to make sure the crop doesn't go hungry.

"In many areas across the country, the last several years have been friendly to low nitrogen rates because the weather has been dry," Ferrie says. "Don't get caught if the summer turns wet."

▶ **Be sure to apply enough early nitrogen to carry corn well into the rapid-growth stage.** "The purpose of the nitrogen that we sidedress is for grain fill after pollination," Ferrie says. "If you don't apply enough nitrogen up front to supply corn well into the rapid-growth stage, it's essential you don't delay the timing of your sidedress application." FJ

Rhonda Brooks *leverages 36 years of experience and farm roots to report on seeds, agronomy and inputs.*

PHOTOS: DARRELL SMITH

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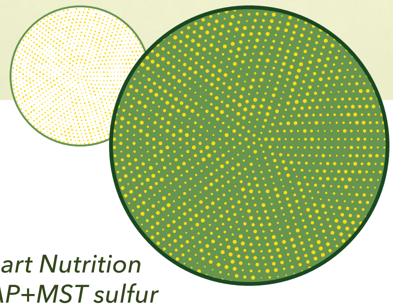

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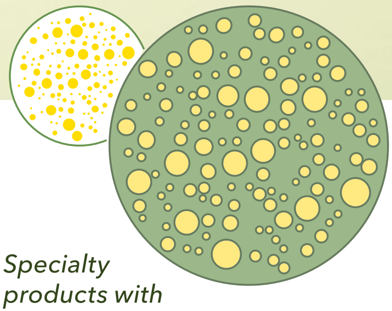

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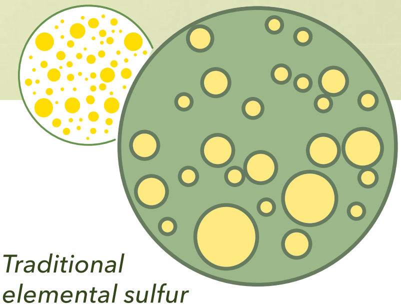

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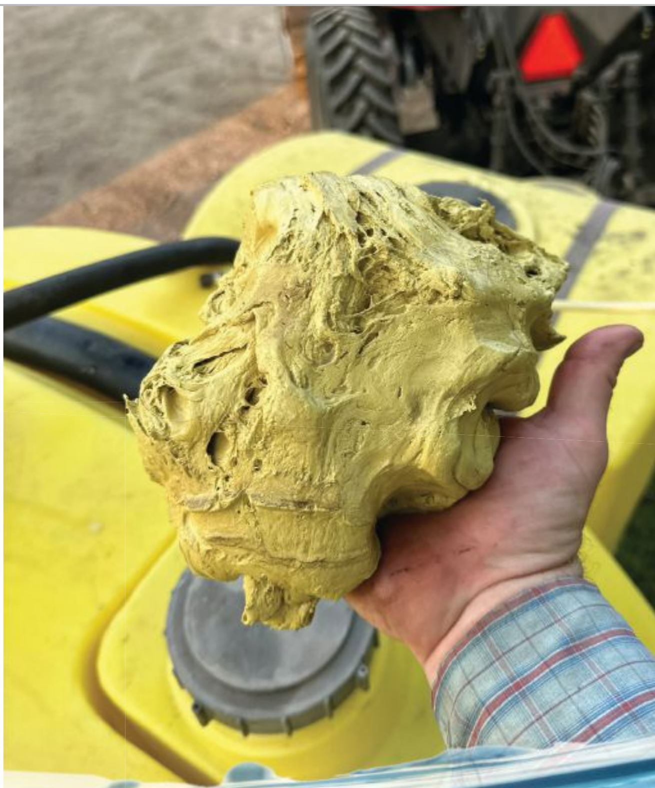
AVOID "WEIRD SCIENCE"

Mixing pesticides for farm use should never be a chemistry experiment



By Dan Anderson

Remember high school chemistry demonstrations where the teacher poured two innocent-looking liquids into a beaker, and the beaker erupted into a volcano of foam? Similar, but less dramatic, chemical reactions can happen when incompatible herbicides are not mixed correctly.

"The days of glyphosate and water made us forget everything we knew about mixing farm chemicals," says Jim Reiss, vice president of development and technical services for Precision Laboratories. "But as we return to tank mixing products, we're dealing with complex chemistries that can be very sensitive to chemical compatibility, mixing sequence and other subtleties that can lead to big problems if they're ignored."

Here are considerations that can determine whether a tank of blended herbicides provides effective weed control or becomes a weird science chemical disaster.

IMPROPER MIXING SEQUENCE

"There are situations where products are compatible and work great if you mix Product A with Product B, then add Product C," Reiss says. "But if you mix A with C then add B, it could turn to cottage cheese. Mixing sequences are detailed in the fine print on product labels, or you can use our free 'Mix Tank App' at *precisionlabs.com* to see if products are compatible. The app also details what sequence to mix them, and other information that can help prevent problems in a spray system."

NOT ENOUGH WATER

"Mixing concentrated pesticides together in a 1,000-gal. solution tank with only 100 gal. or 200 gal. of water in the bottom, or in a mixing vat or induction cone without water at all, is a mixing sin," says Dr. Bryan Young, professor of weed science at Purdue University. "Mixing instructions on labels recommend filling any mixing container half full of water before adding any product, to make sure there's enough water to absorb all the chemicals."

PROPER MIXING TAKES TIME

"People will glug one jug of chemical into an inductor, then glug another one right in behind it before the first chemical can fully mix with the water or carrier," Young says. "We're trying to mix things as fast as we can, and we're forcing too much chemistry to happen all at once."

HARD WATER CAN AFFECT CHEMICALS

"Glyphosate is the poster child for problems with mineral hardness," says Dr. Fred Whitford, director of Purdue University pesticide programs. "If you're using Glyphosate in hard water, you're definitely not getting full effect of the glyphosate on weeds. Hardness levels above 200 mg/L of calcium can cause problems with some chemicals."

UNDERSTAND AGITATION

All spray mixes require agitation at each step of mixing, from pre-mixing through application. "Physical agitation is best," Reiss says. "The turbulence of just pumping chemicals into a tank isn't enough. Sloshing down the road in a transport tank isn't enough. If a transport tank sits on the side of a road for an hour, waiting to refill a sprayer, it should be agitated before transferring to the sprayer."

BE AWARE OF WATER PH AND MINERAL CONTENT

"Some chemicals, like glyphosate, work best in slightly acidic water, around 5.0 to 5.5," Young says. "Other chemicals are more soluble at higher pH, while some pesticides may not be stable at the higher pH."

SITTING MEANS SEPARATION

If a transport tank sits for an hour on the side of the road waiting to fill a sprayer, or overnight, it should be re-agitated before use. Even if the components don't come out of suspension and settle to the bottom of the tank, they can stratify. Stratification means the solution at the bottom of the tank is "hotter" than the layers at the top, which can lead to mysterious in-field streaking and poor weed control as the load is sprayed off.

>

PHOTOS: @DAKOTAFARMER, DR. FRED WHITFIELD, PURDUE UNIVERSITY

A BRIGHT FUTURE FOR UNCONVENTIONAL SOYBEAN USES

When most of us think of soybeans, we conjure up a picture of bushy fields that stretch across the horizon in a Midwestern summer or animal feed being given to livestock. But most consumers may be surprised to learn that soybeans could be in the tires on their car, the asphalt beneath those tires or the candles in their home. In fact, most soy isn't used for human consumption.

Across industries, checkoff funding is helping to create non-food uses for soybeans, finding more sustainable solutions for everyday items. Global economic volatility, as well as changing consumer demand for renewable products, makes the diversification of uses for U.S. soybeans more important than ever. As the supply of soybeans increases from our farmers, the crop will see more visibility as a valuable source for new and innovative uses.

FROM FIELD TO FOREST

Earlier this year U.S. soybean farmers, alongside DEWALT® and Dynamic Green Products, introduced a new soy-based bar-and-chain biodegradable oil, now available nationwide at The Home Depot's 1,380 locations, through a soy checkoff research and development investment.

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8 in.

"To see the checkoff investment in this bar-and-chain oil become widely available for farmers and professionals alike is so exciting for me as both someone who works on behalf of soybean farmers and as a farmer myself," said Steve Reinhard, United Soybean Board chair and soybean farmer from Ohio.

"It's one example of a groundbreaking sustainable solution fueled by soybeans. Discoveries like this only encourage us to continue thinking creatively to discover unique ways we can use soybeans in daily life," Reinhard adds.

This USB initiative, in partnership with DGP, is part of a strategic collaboration with the Airable Research Lab, a division of the Ohio Soybean Council dedicated to bringing sustainable, accessible and environmentally friendly soy solutions to the market in 2024.

FIGHTING FIRE AND FOREVER CHEMICALS

Not only are soybeans a pillar for U.S. farming, but they also now protect those who protect the communities in which we live: firefighters. As a first line of defense, firefighters face numerous risks in hazardous environments with smoke and carcinogens, putting their lives on the line every day. One of the tools they rely on to combat fires is firefighting foam. Traditional foams can expose them to harmful PFAS, or "forever chemicals," linked to adverse health effects.

Through farmer investment and the checkoff, SoyFoam™ TF 1122 was launched as a safer alternative to eliminate exposure to PFAS, prioritizing the well-being of first responders. This revolutionary investment for the soybean industry is made with soy flour and has the potential to use the protein from 12 million bushels of soybeans. As a former volunteer firefighter for 23 years, Reinhard knows firsthand how the various applications of SoyFoam to extinguish and control fires could protect more than 1 million firefighters in the U.S.

"One of our main priorities on behalf of the half-million U.S. soybean farmers is to create biobased alternatives safer for people and our environment. I'm proud that farmers and firefighters are coming together for the greater good," said Reinhard. While soy-based products for biofuels, adhesives, coatings, lubricants and plastics primarily use soybean oil, SoyFoam uses the meal component of the soybean.

With the growth of renewable diesel aimed at decarbonizing the transportation sector, finding new demand streams for the increased soybean meal crush, which makes up 80% of the bean, serves as a key priority of the soy checkoff. SoyFoam demonstrates not only a great investment for U.S. farmers, but for the soybean industry as a whole.

U.S. GROWN FOR TOMORROW'S AMERICA

"Farmers will continue to crush more beans and produce more meal, which is necessary and valuable for the livestock sector, but using soybean flour in this way shows me how much untapped potential remains," said Reinhard. "We'll continue to research new applications that increase the value of a soybean farmer's dollar and put more money back in their pocket. The way I see it, it's a win for the farmer and a win for consumers and industry professionals alike."

To learn more on innovative uses for soybeans and how the United Soybean Board continues to fund the future, visit **unitedsoybean.org.**

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The gradations on plastic transport and sprayer tanks can be off by 100 gal. in a 1,000-gal. tank. Adding enough chemicals to treat 1,000 gal. to a tank that actually only holds 900 gal. wastes money and risks over-application.

"Misjudging volume can cost tens of thousands of dollars over a spraying season," Whitford says. "Calibrated flow meters provide good accuracy. Or, knowing that water weighs 8.34 lb. per gallon, you can weigh a tank full of water to know exactly how many gallons it actually it holds."

The tubes and measuring cups provided with dry chemicals aren't especially accurate. "They warn you on the tube or cup that they can be off by 7% to 10%," he says. "A good set of scales only costs $75 to $100 and can pay for itself by not over- or under-applying."

WHEN IN DOUBT, ADD WATER

If products clump, change color or look weird during mixing, add water immediately. Water is a universal solvent, and since many coagulation and consistency problems with spray mixes start with mixing chemicals too quickly or without enough water, adding water can sometimes rescue an early-stage disaster.

"But in many cases," Young says, "once an actual chemical reaction between two products has developed, there's no going back. It may be best to stop and clean the system while things are still flowable, because if things actually coagulate into cottage cheese, you'll have to clean out the tank and every valve, screen and hose on the machine." **FJ**

Dan Anderson *uses his hands-on experience with farm machinery repairs, field operations and technology to share practical tricks and fixes.*

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[1] Multi-year (2021-2023) on-farm, pre-commercial head-to-head comparisons, 3rd-party trials and on-farm trials (30,037 comparisons) within +/-3 days of RM for Brevant® brand products vs. competitors.

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> *"[Rye] is just a really hardy species. It puts down some roots that will make biomass."*
>
> *~Don Morse*

COVER CROPS TO THE RESCUE

Cereal rye helps Michigan farmer reduce herbicide-resistant marestail and waterhemp

By Rhonda Brooks

When Don Morse began growing cover crops, one of his main goals was to tackle the growing populations of marestail (horseweed) and waterhemp that defied traditional control measures.

"I can give you a half dozen reasons to plant cover crops now, but weed control was a big reason I started using them at the time," recalls Morse, who farms 90 miles north of Detroit, Mich.

APPLICATION PRACTICES

Today, he uses cereal rye across 3,100 acres of corn and soybeans.

Between Labor Day and Oct. 1, Morse aerially seeds cereal rye into no-till corn and soybeans. That timing allows for good stand establishment before winter.

He prefers aerial seeding over the use of a ground rig. "We have a really good aerial applicator with a great skill set, and I think that's what makes it work so well," he says.

For seeding, he uses 75 lb. of cereal rye per acre. The seed runs about $12.50 an acre, and the aerial application costs about $16 per acre. He adds that for a ground rig, the seeding cost runs about $12 an acre.

In the spring, he no-tills soybeans into actively-growing cereal rye. In no-till corn, the cover crop is terminated prior to planting.

"I don't want the rye to get any higher than my knees on corn ground, or we start getting a nitrogen penalty," he says. "If you haven't used cover crops before, I'd start with them in soybeans as there are fewer potential concerns."

Iowa State Extension encourages farmers to evaluate the length of their growing season before planting rye. Longer is better for weed management.

REDUCED HERBICIDE USE

Cereal rye is helping Morse pull back on herbicide rates.

This past spring, on 400 acres of no-till soybeans, he left metribuzin out of his preemergence application, though that wasn't his original plan. Wet conditions kept him out of the field until just before the soybeans emerged.

He did opt to make a post-herbicide application in the field, though few broadleaf weeds were present.

"Probably only half of that field really needed the post application," he says. "I was tempted to not apply anything, but I wasn't that courageous."

Based on the positive results this year, he anticipates using less metribuzin on his 2025 soybean ground.

In a similar vein for corn, Morse says he has cut 4 oz. of mesotrione out of his herbicide program and has seen no negative consequences.

"We've been getting improved weed control, and now it looks like we're going to be able to cut some herbicide use, so this is making financial sense," he says. "We'll keep watching and evaluating our weed control to see how far we can go with it." FJ

***Rhonda Brooks** leverages 36 years of experience and farm roots to report on seeds, agronomy and inputs.*

PHOTOS: DON MORSE, DARRELL SMITH

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By Farm Journal Editors

Bayer Aims for 10 New Products in 10 Years

Bayer expects to launch what it describes as "10 blockbusters" in the next 10 years to support farmers worldwide, the company announced at its 2024 Crop Science innovation update this summer. The new products include a broad acre postemergence herbicide, the first in 30 years, plus a biotech version of its short stature corn platform, new rootworm and insect protection technology, new fungicides and biologicals for pest control including a black pepper-based bird control product.

Leaders with the company say there's potentially $34 billion in sales potential. It also says artificial intelligence is helping speed up its research and its ability to find and test new products.

Bayer officials say they expect to deploy between 400 and 500 seed hybrids and varieties annually while introducing between 90 and 100 new crop protection formulations over the next decade.

WYFFELS HYBRIDS
220

Wyffels Opens New Iowa-Based Facility

Wyffels Hybrids announces its new Iowa-based warehouse and distribution center in Ames is now open for business to serve corn growers throughout its target market geography, with special emphasis on its customers in southern South Dakota, southern Minnesota and western Iowa.

In addition to storage and distribution capabilities, the site includes research and agronomy test sites available to Wyffels sales team members, seed representatives and customers for tours and agronomy days. With continued growth, future expansions include seed corn production capabilities, enhanced research and corn breeding functions, as well as meeting and training resources, the company reports.

The new Wyffels facility is located on approximately 150 acres near Interstate 35 and Highway 30 in Ames.

READ MORE

Scan to find the latest seed news on AgWeb.com.

BioLumic Looks to Enhance Inbred Corn Lines

The world's only company treating seeds with light to activate genetic expression for new crop traits, BioLumic, has achieved a breakthrough in enhancing inbred corn lines. The company is partnering with Beck's Hybrids, Peterson Corn Genetics, Peterson Farms Seed, Breeder Direct and other seed companies to use BioLumic's Genetic Expression Trait light-activated technology on a wide range of inbred and hybrid corn lines aiming to enhance their productivity. The inbred trials specifically target improved germination, emergence, seedling vigor, yield and hybrid seed quality – all issues often associated when working with inbred seed corn breeding and production.

>

PHOTO: WYFFELS

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Scan to find the latest crop chemistry news on *AgWeb.com.*

Corteva Agriscience Introduces New Corn and Soybean Herbicides, Z-Series Soybeans

Corn growers looking for a new way to address tough weeds in corn were able to tap into the benefits of Corteva Agriscience Resicore REV herbicide in 2024. The herbicide is a preplant, pre- and postemergence corn product with three modes of action. Resicore REV controls more than 74 broadleaf and grass weeds and offers farmers increased crop safety and application flexibility on corn up to 24" in height.

For soybean growers, the company introduced Enversa herbicide, which will be available for use in 2025. This residual soybean herbicide controls grass and broadleaf weeds with a proprietary encapsulated acetochlor, elevating crop safety for a healthy crop and greater yield potential. Enversa herbicide is the preferred residual tank-mix partner for Enlist One herbicide for Enlist E3 soybeans.

Corteva announced the commercial availability of new Pioneer brand Z-Series soybeans in the U.S. and Canada. Z-Series soybeans deliver a 2.7-bu.-per-acre advantage over the company's A-Series soybeans.

Wilbur-Ellis Launches New Soybean Brand, Addresses Tough Weeds

The new Fortus brand of soybeans with the Enlist E3 trait will be available in the upper Midwest and Plains states for 2025, according to Wilbur-Ellis.

The Fortus brand will include up to 12 varieties in all maturities from Group 0 to Group 4, aligning well with farmer's growing conditions and agronomic needs in those regions.

Company officials say the yield potential for the new varieties has been confirmed through WEGrow Trials, designed and conducted by independent, third-party research organizations.

BASF Unveils Nematode Resistance Trait

The company announces a new innovation for soybean cyst nematode management is in the works: Nemasphere. Company officials say it is the first and only biotechnology trait for SCN, harnessing a completely novel mode of action. Nemasphere produces a novel Cry14 protein that is ingested by nematodes, interfering with nutrient uptake and leading to their death. On average, BASF says the trait boosts yield potential by 8%. Nemasphere is set to be available in 2028, pending regulatory approval.

BASF Surtain herbicide received EPA approval in February. It is the first solid encapsulated premix formulated product on the market for use in field corn, using the latest technology and innovations focusing on residual endurance to deliver application flexibility for postemergence applications up to three weeks after planting. The herbicide provides early-season residual control of small- and large-seeded broadleaf weeds and grasses for up to eight weeks, providing growers with non-HPPD residual control and flexibility during the busy spring season. FJ

PHOTO: GREG VINCENT

218-BUSHEL YIELD

Alex Harrell shatters soybean world record

The record soybeans averaged around 3.1 beans per pod.

By Chris Bennett

On Aug. 13, Alex Harrell fired the soybean shot heard round the farm world – eclipsing his own world record of 206.79 bu., set in 2023, with a 218.28 bu. yield. Back to back, he has grown the highest yielding soybeans in history.

"At harvest, I thought I was in the ballpark of last year's 206, but I never thought it'd be so high," Harrell says. "It's an incredible result, but it's a whole different story from last year."

CHANGING THE FORMULA

On 4,000 acres in Lee County, Ga., Harrell grows corn, soybeans, watermelons and wheat. In 2024, he aimed for the bull's-eye again but decided to change gears across the entire setup.

On March 21, he punched a Pioneer P49Z02E variety (4.9 maturity group) at a 110,000-planting population into red clay watered by center pivot irrigation on the opposite end of the county from his previous year's success.

> *"You hope and you can tell a field is going to be special," Alex Harrell says. "But 218? I'm overwhelmed."*

Harrell was searching for a repeat performance in a separate environment, other than maintaining 30" rows.

"Starting off, we used less preplant chicken litter," he says. "I used a different genetic trait and different herbicide trait, pretty much different everything, but still shot for the same result."

He ran double strip-till at planting. First, a deep pass. Second, a shallow pass with banded fertility in front of the planter.

"We still ran in-furrow, and 3x3 fertility on the planter; we sprayed preemerge herbicide out the back," Harrell says. "Basically, we had four things going out at planting: seed, an in-furrow mix, a 3x3 mix, and a herbicide mix broadcast out the back."

"We utilized Enlist," he adds. "We used weekly tissue sampling, then Y-dropped and foliar fed accordingly. Almost everything changed from 2023."

GRAIN FILL GLORY

At emergence, Harrell detected potential for major yield numbers with no skips or doubles and a final stand of 105,000. Then, at harvest, with his father, Rodney, watching the yield tally climb, Harrell hit 218.28 bu. per acre on 2.58 acres, with the remainder of the field north of 100 bpa. The record soybeans averaged almost 3.1 beans per pod. His 2023 average was 2.8 beans per pod.

In 2023, Harrell defined his first high-yield record breaker by late-season management. In 2024, what high-yield factors were most important?

"This was about getting the beans in early, having them bloom, going though grain fill during the longest days of the year and increasing seed size," he says. "It was also about keeping the nutrition balanced, keeping fertilizer levels up, and giving plant growth regulators a big part. We never missed an opportunity to have an application made this year, but last year, we missed a couple of windows and were a few days behind, and that cost us bushels."

Not this time. Harrell was spot-on. "The beans got what they needed on the day needed," he says. "No delays."

Indeed. After all the agronomics are dissected and the numbers parsed, the reality is simple. In 2024, Harrell grew the highest yielding soybeans in the history of the world. FJ

__Chris Bennett__ is drawn to stories of innovation and those traveling an odd trail. He loves squirrel hunting and walking fields near his Mississippi home.

PHOTOS: DAVID PARKS PHOTOGRAPHY, ALEX HARRELL

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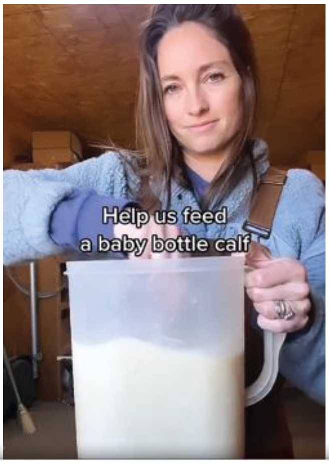
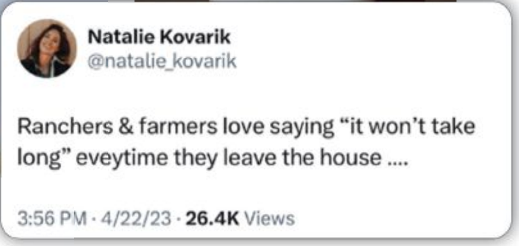
MERGE CITY AND RURAL

Nebraska cattle rancher and influencer aims to close the gap





Natalie Kovarik
@natalie_kovarik

Ranchers & farmers love saying "it won't take long" eveytime they leave the house ....

3:56 PM · 4/22/23 · **26.4K** Views

By Jack Heffron

When Natalie Kovarik was growing up on the family ranch in Montana, she had no intention of staying in the ag world. She went off to college, earned a degree in pharmacy and took a job in a city. While back home at the ranch for a short visit, however, she met her soon-to-be husband and eventually ended up raising a family on a cattle ranch in the Sand Hills of Nebraska. She now finds herself not only back in the ag world but a social media ambassador for it.

On the latest episode of "Grow Getters," a new Farm Journal podcast that celebrates America's most inventive 'agri-preneurs,' Kovarik shares how she has become a powerful voice in spreading the word about how food is grown and livestock is raised. Her goal is to bridge the widening gap between rural and urban life and to foster a clearer understanding between those worlds.

"I think my biggest thing is just reminding people there is a person or a face and a family behind food," Kovarik tells Grow Getters host Davis Michaelsen. "I think all the fear and misinformation and consumer confusion is rooted around that missing piece. I think trust would be increased substantially if they were able to connect their food with a person."

Through her celebration of Western culture and agriculture, Natalie Kovarik has been able to cultivate a large and enthusiastic following.

By spreading this message effectively, Kovarik has amassed a social media audience numbering well into six figures. She also co-hosts a podcast called "Discover Ag" with dairy farmer Tara Vander Dussen, on which the pair covers what's new in the world of food. But achieving such success didn't come without some false starts and deft pivots.

"I think there's beauty in testing different paths and seeing what fits for you," she says. "If you look back at my journey, I've always been one to kind of go down a path and then say, 'Is this working or is it not?' And then kind of scale back or continue forward. And I always try and give that advice to youth because sometimes that's not the advice they get." **FJ**

***Jack Heffron** is senior writer and producer for Farm Journal Studios.*

LISTEN NOW

Scan to hear the full interview with Natalie Kovarik on **"Grow Getters,"** our new podcast that features today's farmers who are creating additional revenue streams.

GROW GETTERS

PHOTOS: @NATALIE_KOVARIK

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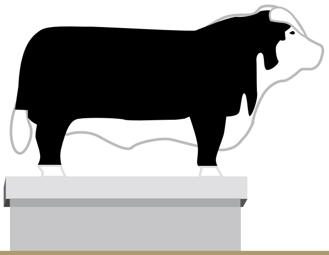

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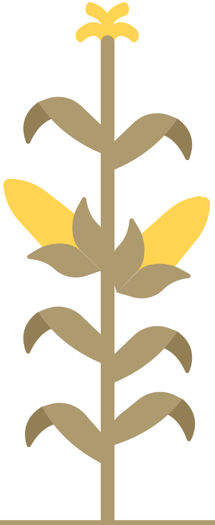

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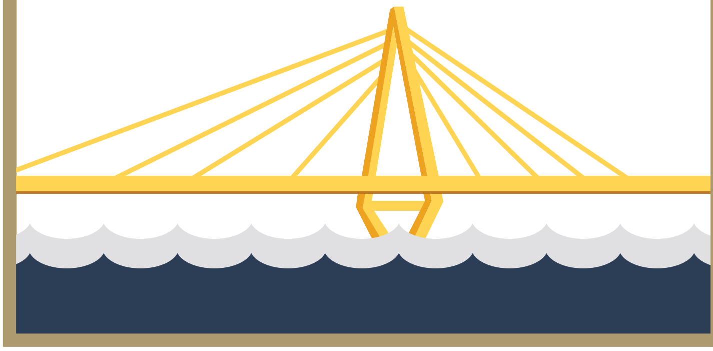

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3 TRENDS I'M NOTICING THIS FALL

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By Greg Peterson

The Phil Rensink farm estate auction in Hospers, Iowa during early August left me with three main takeaways for the direction of used farm machinery.

1 Used hay equipment in good condition is selling strong. On Aug. 1, a 2022 Rollbelt 560 Special Crop Plus round baler that had made 1,810 bales sold in Solen, N.D., for $53,975. It marked a record-high price for a New Holland round baler sold at auction. Turns out, its status would only last a day. During the Rensink sale, a 2021 New Holland Rollbelt 560 Specialty Crop Plus round baler that had only made 102 bales sold for $56,000.

2022 Case IH 2150 Early Riser 24R-30 planter, one owner, 814 acres, sold for $270,000 on an Aug. 22 farm estate auction in Hospers, Iowa

2 10-years-old and older tractors in good condition are holding their value better. The Rensink sale saw a 2012 Challenger MT865C track tractor with 1,678 hours and 36" tracks sell for $315,000 – a new record high auction price on that model by almost $15,000.

3 Late-model, used planters are selling OK. A 2022 Case IH 2150 Early Riser 24R-30 planter with one owner and 814 acres under its belt broke a record set for that model in March by $25,000 – selling for $270,000 at the Rensink sale.

WHY IT'S SIGNIFICANT

I find that last trend to be quite interesting on planters. Late-model, used planters have definitely been selling a bit stronger at auction so far this year when compared to late-model tractors and combines, which have had much more pronounced sale price slippage. Perhaps it's an odd bit of carryover effect from 2021 and 2022 when new planters were extremely difficult to get during the pandemic supply chain mess.

Auction sale pricing on late-model, used planters has been holding strong despite a huge spike in the number of new to 3-year-old planters hitting the auction block in 2024. From the start of 2024 through Aug. 4, I've seen 66 new to 3-year-old planters sold at auction. There were 20 a year ago, 10 in 2022, 14 in 2021 and a mere six in 2019. We have to go back nine years to find any year even remotely close in number: 39 in 2015.

>

PHOTO: MACHINERY PETE

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Highest Auction Prices on Planters in 2024

YEAR	MAKE	MODEL	NO. ROWS	PRICE	DATE	LOCATION
2023	John Deere	DB60	47R-15	$375,000	3/22/24	Paris, MO
2023	John Deere	DB60	36R-20	$365,000	3/22/24	Paris, MO
2023	John Deere	1775NT	24R-30	$340,000	6/28/24	Pacific Junction, IA
2023	John Deere	DB80	32R-30	$325,000	7/27/24	Paris, MO
2023	John Deere	1775NT	24R-30	$320,000	1/27/24	Paris, MO
2022	Case IH	2160	47R1-15	$319,000	2/27/24	Monroeville, OH

A SOFTENING MARKET

Late-model, used planter values might be holding value better than their tractor and combine counterparts, but they've softened overall.

Rewinding a few days to July 27, we filmed a huge consignment auction in Paris, Mo. Inside six auction rings, the good, old fashioned, in-person sale sold 4,000 equipment items between 8:30 a.m. and 9 p.m. It was the largest line up of large, late-model, used farm equipment I've ever seen in my nearly 35 years tracking auctions.

There were plenty of planters, but a particular pair of them caught my eye:

- **2023 John Deere DB80 32R-30**
  Exact Emerge with 6,405 acres sold for $325,000
- **2023 John Deere 1775NT 24R-30**
  Electric Drive with 5,212 acres sold for $275,000

This is compared to a few months ago in March, when the two highest auction sale prices so far this year on planters also came from Paris, Mo: a 2023 John Deere DB60 47R-15 Electric Drive with 4,599 acres (a record $375,000) and a 2023 John Deere DB60 ME5 Pkg. 36R-20 with 3,911 acres ($365,000).

I'd bet the rest of 2024 will see farm equipment dealers aggressively taking late-model planters (along with tractors and combines) to auction to stay ahead of the softening used market. FJ

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AGCO Divests Protein and Grain Business

In July, AGCO announced its intention to divest its protein and grain handling business units. The units will be sold to American Industrial Partners in an all-cash transaction for $700 million.

The transaction includes AGCO's five primary grain and protein brands:

- **GSI**
- **Automated Production (AP)**
- **Cumberland**
- **Cimbria**
- **Tecno**

AGCO expects to incur a $400 to $475 million loss on the transaction once finalized, according to the company.

The transaction will exclude AGCO's grain and protein business in China, and is anticipated to close before the end of the year subject to regulatory approvals and closing terms.

By Matthew J. Grassi

Farmwave Harvest Loss Combine Kits Gain Traction in Down Farm Economy

Farmwave is an aftermarket kit that helps reduce grain loss by providing real-time data from the header and the rear of the combine. Operators can adjust various settings on the machine to save lost grain and revenue.

Developed by CEO Craig Ganssle, it uses AI and LiDAR-equipped cameras to analyze images and alert operators on a dedicated, ruggedized Dell tablet mounted in the cab. Farmers can set loss targets now, and future automation is in the game plan.

The system has already proven cost-effective for early adopters, according to the company. Farmwave's ongoing development involves feedback from tech-savvy farmers that test the systems on their own combines.

Heinen Brothers & Kelly Hills Unmanned Announce Ag Drone Testing Corridor, Pelican Spray Drone Addition

Heinen Brothers Agra Services, a provider of aerial application services throughout the Midwest, and its subsidiary Kelly Hills Unmanned Systems have gained FAA approval for an ag drone test range spanning four states and 49,000 sq. mi.

FAA approved the unmanned aerial systems test range covering partial airspace in Kansas, Missouri, Iowa and Nebraska. The range provides the ability to host fixed-wing, multirotor, and rotary-wing systems testing applications on 10 different crops including corn, soybeans and milo.

Heinen Brothers also announced it has added the Pika Pelican Spray drone to its aerial application fleet. Pelican Spray is considered the largest autonomous aerial application aircraft, according to the company. It has a 74-gal. payload capacity and can cover 210 acres per hour with a 60' swath width. FJ

__Matthew J. Grassi__ covers technology and machinery. He is an expert commercial drone pilot and an advocate for the practical use of technology in food, feed and fiber production.

PHOTOS: MATTHEW J. GRASSI, HEINEN BROTHERS AGRA SERVICES

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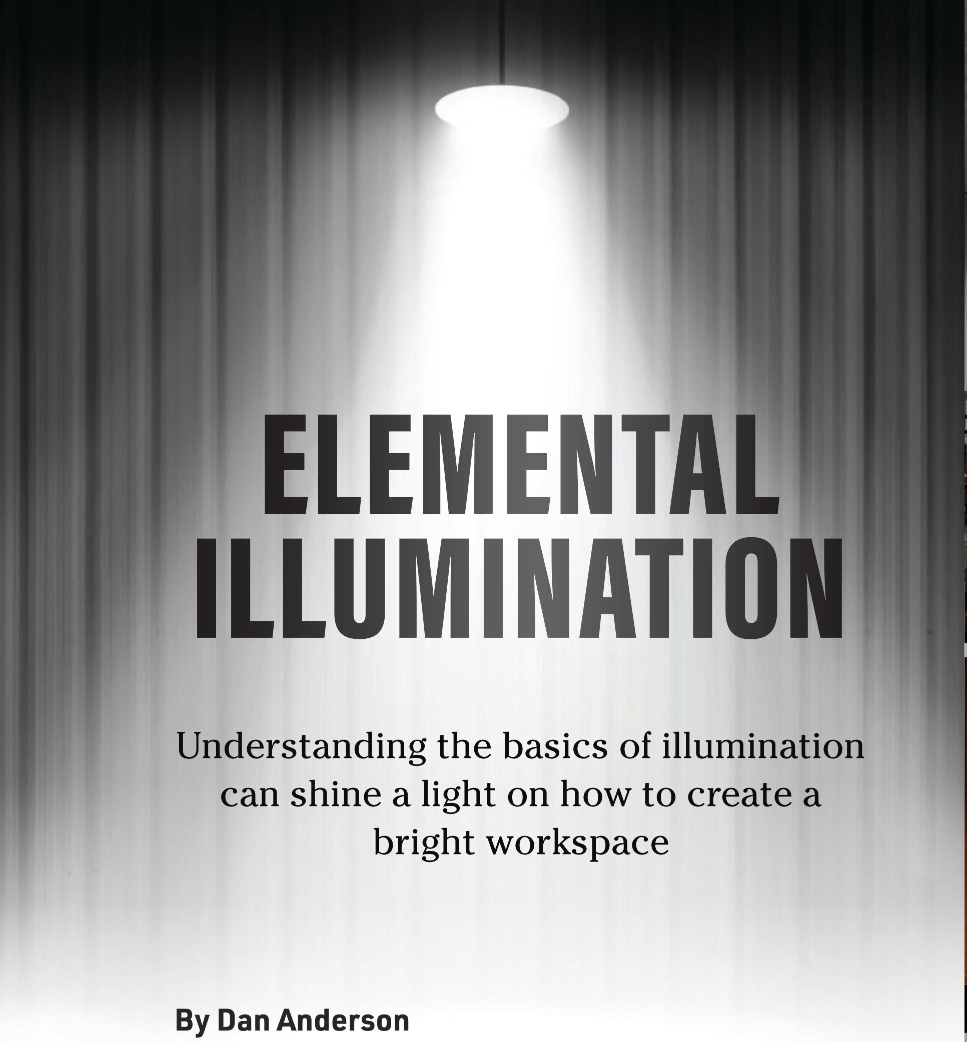
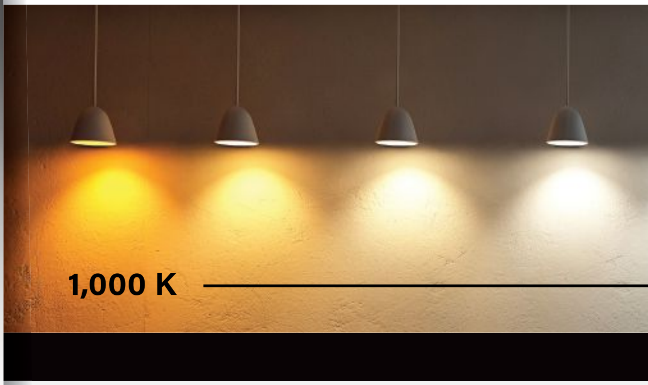


ELEMENTAL ILLUMINATION

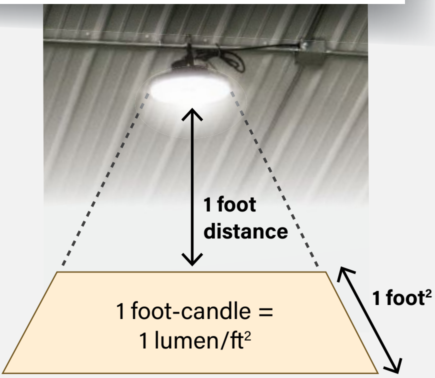
Understanding the basics of illumination can shine a light on how to create a bright workspace



By Dan Anderson

What's the first thing a person does when they walk into a farm shop? Turn on the lights. Here are considerations when designing and selecting lighting systems for farm shops to ensure the brightest, most economical results:

1 Lumens and foot-candles are linked but separate concepts. A lumen is a measure of the light output of a light source, measured at the lamp and/or light fixture. A foot-candle is one lumen per square foot of illuminated surface.



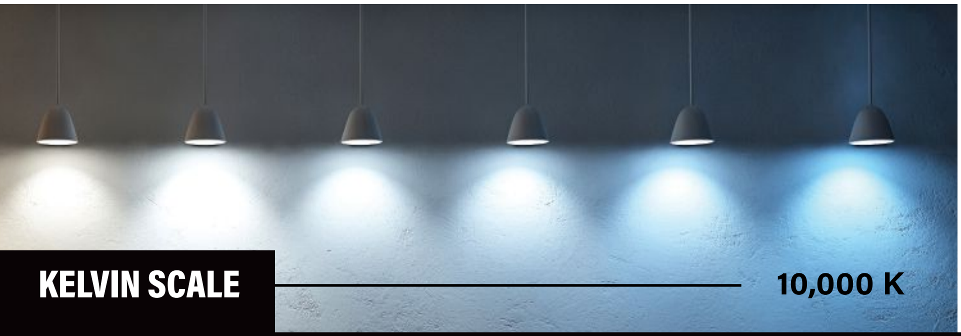
"I'll often design a workshop to have 30 to 50 foot-candles of overall lighting, depending on what kind of work is being done in the shop," says Todd Tiernan, with Graybar Electrical Supply, "Then add task lighting over workbenches and other areas that require additional light. The overall design considers the size of the building, ceiling height, the color of ceiling and walls, and at what height off the floor most of the work will be done."

2 Lamps (light bulbs) and light fixtures are also rated for their "light color temperature" in degrees Kelvin (K). The lower the Kelvin temperature of a light, the more yellowish or reddish it is. The higher the Kelvin temperature rating of a lamp, the more whitish or bluish its light becomes.

"In a house, I might recommend a 2,700 K to 3,000 K light, for a warmer and more comfortable glow," Tiernan says. "In most workshops, I'll aim for more of a 4,000 K to 5,000 K light to achieve a more neutral light or something that approximates sunlight. A 4,000 K light would be more of a pure whitish light, while a 5,000 K light would have a slightly bluish tint. Since our eyes are more susceptible to the blue end of the light spectrum, a bluish light seems brighter to us even though they're both producing the same number of lumens."

This light location illuminates the lower two-thirds of the left side wall, reducing the need for lights on the sidewall to illuminate work benches.

Sidewall lights brighten work benches and help illuminate the sides and undersides of large equipment that are shadowed by overhead lights.



Kelvin temperature ratings for common lights range from 1,000 to 10,000 K. Lower temps appear yellowish and warmer. Higher temps trend toward white and eventually bluish.

3 **Any type of lighting fades over time due to "lumen depreciation."** For example, incandescent lamps initially produce 18 to 20 lumens per watt, but dim by 10% to 15% during their lifetime. T-5 fluorescent lamps dim by 10% to 15% over time. Metal halide lights used in many warehouses average 100 lumens per watt but lose 35% to 40% of their illumination during their lifetime. Most LED lights for workshops can currently go up to 180 lumens per watt and maintain more than 70% of initial lumen output during their predicted lifespan, which typically lasts two times longer than a conventional incandescent or fluorescent light.

4 **LED lights are directional.** Incandescent and fluorescent lights splay light for almost 360° around the bulb, requiring reflectors to direct light down toward a work surface. "LEDs push light in specific directions," says Brian Methe, lighting team leader with 3-E Electric in Des Moines. "That's why ceiling height must be included when choosing which lights to install. With the wrong lights, you could have bright or dark strips where the lights' patterns overlap too much or too little."

5 **Older shops or buildings with fluorescent lights suffering from degraded ballasts or lumen depreciation can be upgraded in most cases to LED lighting.** "If there are two or more rows of T-5 fluorescents, you may be able to swap them one-for-one with LED fixtures," Methe says. "If you're concerned that the old lights are 'dim,' realize that they may have lost a lot of their illumination with age, and that new LED lights of the same lumens might get you back to where you were. Or, it may be a good time to upgrade and brighten the entire shop with more powerful LEDs."

6 **Shop offices and meeting rooms benefit from different lighting than the shop's work area.** "Ceilings in offices are lower, so the fixtures need to match that ceiling height," Methe says. "Also, a bright white light might be nice in the working area, but seem harsh in an office. I recommend office lighting in the range of 3,500 K to 4,000 K."

>

PHOTOS: DAN ANDERSON, ISTOCK

Square-grid LED lights hung from a sloped ceiling need to be suspended at equal height above the floor to ensure even illumination.

7 Light fixtures have an IP, which stands for ingress protection. IP ratings have two digits. The first is protection against solid particles, and the second is protection against liquids. The higher the IP values, the more protection.

IP solid-protection ratings go from zero to 6, with IP 5 being "dust-protected" and IP 6 being "dust-sealed." IP fluid-protection ratings go from zero to 9, with IP 3 safe for exposure to vertically-sprayed water and IP 9 protecting from high-pressure water and steam. An IP 59 light would be for a dusty environment with high-pressure water and steam.

"An IP 65-rated light fixture is a good fit for a general-purpose shop," Methe says."The '6' means it's dust-tight, and the '5' means it's protected against jets of water from all directions."

8 Incandescent and fluorescent lights are available, though 13 U.S. states, along with Canada, have announced upcoming bans on fluorescent lamps. Most new installations in farm shops use LED fixtures. While studies by the U.S. Department of Energy indicate the initial purchase price for LEDs is slightly higher than fluorescents, they are 25% to 75% more efficient. LEDs also have a longer lifespan.

9 There's a tendency to cut corners when illuminating parts rooms and storage areas. Which is ironic, because bright lights are needed more than ever when reading small-print part numbers on parts packages or rooting for a critical part in the back corners of storage bins. FJ

***Dan Anderson** uses his hands-on experience with farm machinery repairs, field operations and technology to share practical tricks and fixes.*

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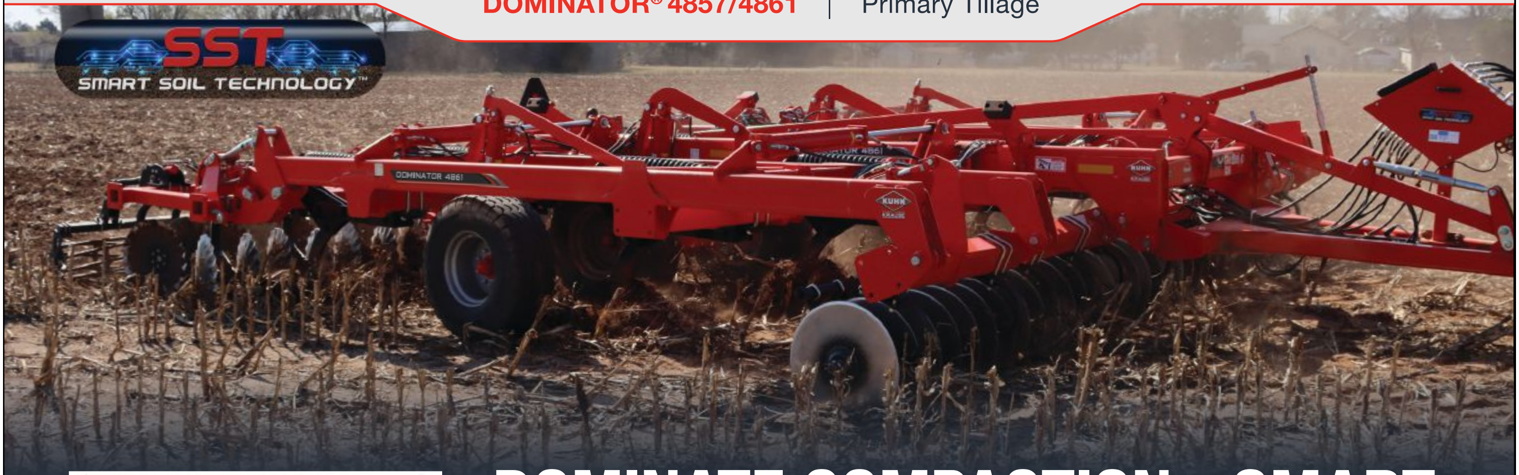

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DON'T LEAVE YOUR OFFICE BEHIND

Heather Gieseke's insights have helped position agribusinesses for both growth and sustainability — from risk management to carbon mitigation and emission reduction. A leader of Pinion's sustainability practice, she champions sustainability for the farm, family and business.

heather.gieseke@pinionglobal.com

By Heather Gieseke

Like many U.S. farms, your office might be the slowest part of your operation to modernize. In fact, the most common accounting software used by farmers is from the 1990s. How many of your farm implements are you still using from that time?

Today's office technology can upgrade your work routine from data-entry tasks to more analytical and cost-control activities, but many farms aren't keeping up.

"Most farmers have amazing technology in their tractors and trucks," says Bill Hoover, Pinion's business development manager. "They have sophisticated ways of collecting data in the field. They can look on their phones and see where their equipment is 24/7, but they haven't thought about adopting technology in their office."

> *"With an automated and powerful office, you can have information that can really change the game for you."*

FROM OFFICE TO DATA WAREHOUSE

Those who do, however, are finding big benefits. Their offices are becoming data warehouses that generate production analytics in near real time. Building a "tech stack," or multiple integrated software systems, they use automation and standardization to reduce much of the data-entry work in the office. Artificial intelligence (AI) technology is categorizing accounts payable, commodity transactions and deliveries, bank transactions and reconciliation. This reduces errors across financial reporting, expense management, payroll and tax compliance. Imagine approving contracts and invoices while you wait for your child's soccer match to start.

In the process, progressive farmers are bridging the divide between data and decisions. They can see both granular detail and the big picture. What crops are performing best? What expenses should they focus on? What is the best market logistically for fall grain deliveries? They're streamlining, categorizing and improving financial understanding. In the process, they're saving time and money that can be used for higher-value activities on the farm, Hoover says.

"If your operation has grown, and you are still trying to run a 12,000-acre farm on a 3,000-acre system, you need better optimization in your office," says Judah Cofer, Pinion business leader. "With an automated and more powerful office, you can have information that can really change the game for you."

WHERE DO YOU START?

Add up how much time you're actually spending on your bookkeeping process. As you research and evaluate the components of your tech stack, visualize that you are hiring a new employee who will provide data entry, timely reporting and powerful analytics – and who will work 24/7 with no lunch breaks. Then try to visualize how you or your employees could benefit from spending that time elsewhere. This is your new budget for improved office software. Happy shopping! FJ

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WILD PIGS ATTACK FARM

Alabama farmers' crops and cattle hit by wild pigs

> *"We either work to keep the pigs at bay or we don't farm."*
>
> *~ C.J. Jackson, right, alongside his father, Carl*

By Chris Bennett

Another dead calf. Another deep hole. Another strafe-bombed pasture. Welcome to a farm where wild pigs roam.

A plague descends nightly on Carl and C.J. Jackson's land as wild pigs emerge from adjacent river bottoms, intent on rooting row crops and bulldozing fields. The level of destruction is stunning.

"It's taking us to a breaking point," Carl says. "We're getting close to wild pigs making it impossible to farm, and when you add in deer damage, the costs are crazy."

There are multiple modes of trapping, electric fencing and thermal shooting, yet they thrive.

The father and son farming duo have endured a freakish level of damage, periodically losing entire crop fields.

"We're at a place where if a piece of farmland becomes available, our first question isn't, 'What about soil or drainage?'" C.J. says. "It's, 'What about pigs and deer?'"

CALF KILLERS

In a realm of heavy timber, Spanish moss and big gators, the Jacksons run 200 cows and grow 800 acres of corn, soybeans and wheat on leased, sandy ground in Wilcox County, Alabama.

Against the ink of rural nightfall, in the glow of a thermal ATN scope mounted atop an AR-15, C.J. counts 25 wild pigs, multiple sounders of sows and piglets and several boars, laced through his cattle herd.

The pigs are on a hunt for groceries, capable of foraging roots to feasting on row crops and tree nuts to consuming the remains of dead mammals to functioning as predators. The pigs eat 3% to 5% of their body weight daily.

"Typically, we see 200 lb. sows and boars that get much, much bigger," C.J. says.

Extraordinary diggers, wild pigs sport an hourglass nasal bone that enables them to lean in with stout neck muscles when rooting pasture and farmland, leaving a pocked, ravaged appearance across the flipped ground. The same snout is also highly sensitive to smell, picking up scents from 5 miles away or several feet beneath the soil.

Pasture and hay field damage on the Jackson's operation is widespread and deep enough to trap livestock.

"I've lost several calves to the pigs," C.J. says. "They root grass and sometimes go down 2' deep. The calves get stuck on their sides in the hog root holes, can't get back up,

>

PHOTOS: DOUBLE J FARMS

ROOT REVEAL

Did you know root volume can impact corn yield by as much as 40 Bu./A. depending on the soil fertility system?*

*Data collected and verified from the University of Illinois under Dr. Scott Foxhoven and Dr. Fred Below.

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ROOT REVEAL

Did you know for every 1,000-plant increase in planting population, root volume declines by 2.5%?

*Data collected from a collaborative research project between Beck's and Dr. Fred Below at the University of Illinois.

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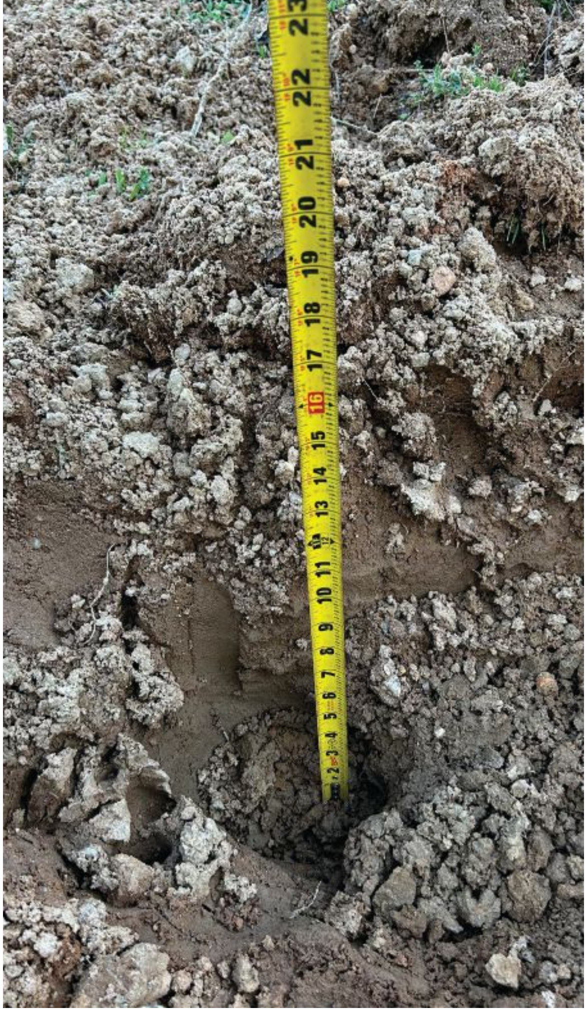

and die. It's something you've got to see to truly understand."

Repairs to their rooted acreage are incessant.

"That ground has to be smoothed back over – money, time and man-hours," Carl says. "Try baling hay across a root when you're stuck in first gear and should really be going about seven miles per hour."

"People who think you can trap or shoot your way out of the problem don't have a clue," he adds. "I know for sure we've got hundreds of pigs around us, but it seems like thousands. These creatures have intelligence and adaptability like nothing I've seen in my lifetime, and they come back smarter every time."

"THEY DESTROY EVERYTHING"

Strip tillage on 30" rows doesn't fare well under a wild pig's feet, and replants are a given for the Jacksons. "In winter, the pig pressure drops," C.J. notes. "They root covers, but nowhere to the extent of cash crops. But at planting, they'll show up every time. They can go down the row and get every seed in a straight line for half a mile."

Once a crop is up, the pigs press harder. "They're bad on corn like nothing else," he says. "They don't root in a pattern, but they'll take out a row, move over a row, and knock down three more rows and keep it random. In just a couple days, you're dealing with five or six acres with 50% stand. Do nothing, and the damage explodes."

"They destroy everything," C.J. continues. "They don't only consume a crop like deer."

Strong words, considering deer take a sizable bite out of C.J.'s grain yields: 75 deer munching in a 100-acre field is not unusual.

> *"The turning of the ground by the pigs is something you've got to see with your own eyes to truly understand."*
>
> *~ C.J. Jackson*

"We've got relatively small deer, but tremendous numbers, and deer predation is terrible, especially in soybeans on the ends."

Their corn crop also takes a deer hit, Carl echoes.

"There are so many deer that we've had them eat the small stalks, then the silk and then the kernels when the corn was drying. We cull with permits, and that's a big help, but although deer damage is very significant, it doesn't compare with wild pigs. With the pigs, we either stay active or we're going to be out of business."

In 2013, Carl put electric fencing charged by 10,000 volts around three of his most heavily hit fields – a partial pig deterrent. "The electricity keeps the family groups out, but not the boars," he says. "The big boars crash right through it. In those three fields, we couldn't grow a crop if we didn't have the electric fencing because of the pig pressure.

SHANGRI-LA

In the early 1980s, wild pigs covered 25 counties in Alabama. Today, every county in the state has wild pigs for a total population estimated at 250,000 that inflicts $55 million in agriculture damage per year, according to ACES. (Nationwide, the U.S. wild pig population, per APHIS, stands at 6 million-plus and inflicts over $1 billion in annual agriculture damage.)

Wilcox County, heavily timbered with ample bottom ground, is a wild pig Shangri-La. In Carl's lifetime, Wilcox County has moved from rare wild pig sightings to wild pig roadkill regulars.

"Supposedly, some Russian boars were released nearby in the 1960s and 1970s to kill beavers," he says. "Those same pigs never moved and thrived in the swamps. Then, they exploded outward. Combine that with intentional releases from some hunters, and the population went wild."

In the early 1990s, Carl spotted the first wild pigs of his life – a pleasant curiosity at the time.

"I thought they were kind of cool, just like another animal to hunt," he says. "I'd have never believed it if someone had told me destruction was following right behind."

PHOTO: DOUBLE J FARMS

BAY OF PIGS

Wild pigs reproduce at an exceptionally high rate, with sows often delivering two litters (six piglet average per litter) in 15 months. Females are reproductively capable at five to six months. Most wild pig biologists place the "control" bar at roughly 66% to 75%. So, if a region has a wild pig population of 100,000, then 66,000 to 75,000 must be killed each year to keep the population at the floor of 100,000.

Trapping is an effective tool, but it is by no means a turnkey solution, C.J. describes. He uses net-style Pig Brig traps and electronic door traps, sometimes bagging entire sounders.

"The traps work well, but the pigs always still come back in waves, and then suddenly we're covered," he says. "Trapping, electric fencing, and shooting are what we have to do, but it's two steps forward and three steps back because we're not hurting their overall population. We either work to keep the pigs at bay or we don't farm."

KILL ON SIGHT

Wild pig and deer damages are factored into the Jackson's farming budget: yield loss, labor, equipment and a tremendous load of time.

"When you see the damage up close, sometimes on a daily basis, it's so disheartening to work so hard, pay the rent, pay the input prices, and then have a darn pig eat your seed or root your hayfield," Carl says.

"Our wildlife expenses are factored into our cost per acre to farm," C.J. explains. "Let me put it this way: It is a very significant number."

At age 28, how does C.J. see the wild pig equation in the future? "I hear about potential toxins and baits, but I'm really not too hopeful. I don't think anything will pan out long-term to make an overall difference."

"There's one guarantee in the future, and it's not toxins, birth control or a wipeout disease," he continues. "No, the guarantee is the pigs are here to stay. It's only a question of their quantity and effect. Personally, I don't see their numbers going down."

Carl ends with this notion: "I realize every state has its own hunting laws and views, but the only common-sense solution is to take out the pigs whenever possible. Kill on sight." **FJ**

__Chris Bennett__ is drawn to stories of innovation and those traveling an odd trail. He loves squirrel hunting and walking fields near his Mississippi home.

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SUMMER WILD CARDS TO WATCH

As Farm Journal Economist and host of the "AgriTalk" radio program, Chip Flory helps farmers understand the markets and seize opportunities.

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By Chip Flory

It's clear sustainable aviation fuel (SAF) could affect corn and soybean profitability for years to come. The demand for ethanol and bio-based diesel is widely based on how successful biofuels are in feeding the SAF market. That success might be determined by the U.S. Department of the Treasury.

It seems strange for the Treasury to determine the production practices needed to qualify corn- and soybean-based biofuels for tax credits. If you produce corn and soybeans that biofuels processors will use to claim 45Z tax credits, your crops will have greater profit potential.

That's how the outlook is set up now, but two scenarios are possible after this fall:

▶ **A Harris administration** would likely continue the "climate-smart" initiatives in the Inflation Reduction Act, including 45Z.

▶ **A second Trump administration** would bring changes. He told a rally in July, "They want to make our jet fighters [use] a biofuel that shows 18% less efficiency. That's the difference between winning and losing a fight. You know what happens? I say I'm not doing it. We ended all of that stuff. They brought it back. We will end it on day one."

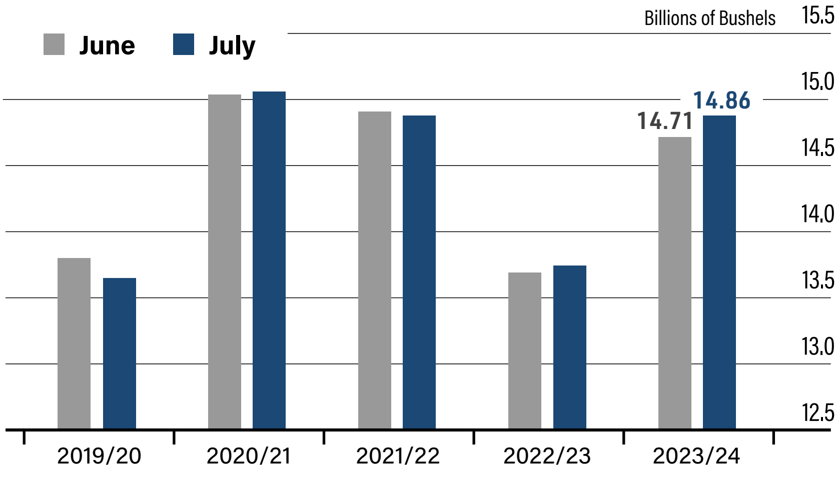
While that puts the future of SAF in question, a Trump presidency would extend the use of liquid fuels. Liquid fossil fuels need the octane from corn-based ethanol. That's "less flashy" than SAF, but it could bring consistent, extended ethanol demand.

DON'T SLEEP ON JULY

Traders didn't expect big changes in the July World Ag Supply & Demand Estimates (WASDE). But a quick check of the numbers shows old-crop usage estimates can swing widely in the July WASDE and the 150-million-bushel increase in 2023/24 corn use from June to July is an example. Total use in July 2022/23 increased 50 million bushels from June; use dropped 25 million between June and July in 2021/22, increased 25 million bushels in 2020/21 and estimated total use in the 2019/20 marketing year fell 145 million bushels from June to July. Those are market-moving old-crop adjustments when traders are almost fully focused on new-crop supply-side fundamentals.

Bottom line: Don't sleep on the July WASDE. The World Ag Outlook Board at USDA has clearly targeted the July WASDE as a month to adjust corn usage estimates heading into the final six weeks of the old-crop marketing year. FJ

Historic Changes in July WASDE Reports



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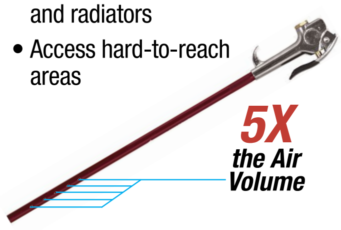

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Sump Saver for the win. Unplugged a sump in a 48/13 in less than 15 min. Thanks for a great product. // **Joe (Seymour, IL)**

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January • February

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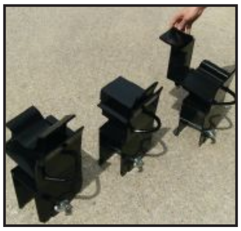

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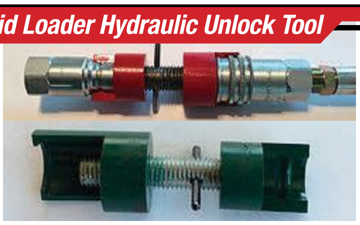

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Wheat Mural Draws Attention to Kansas Town

By Tyne Morgan

An aging grain silo in Inman, Kan., served as a blank canvas for Mindy Allen, and over six weeks it became her largest mural yet at 108' tall.

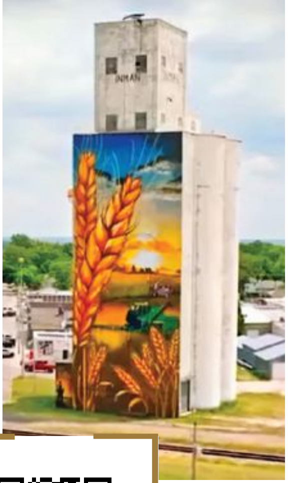
"It's the largest on all aspects: time frame, size, budget, exposure, every single thing about it. This is the biggest that I've ever done," Allen says.

The inspiration for his vivid picture of Kansas wheat started with one man.

"The picture of the farmer standing here and looking at all this, so many of us can drive up and say, 'That is my dad. I can see my dad doing that,'" Ron Regehr, with the Inman Museum, told "U.S. Farm Report" affiliate KWCH.

Regehr contacted Allen to bring his idea to life and help draw attention to the town's museum.

What started as a dream has turned into a picture-perfect reality that is now a new attraction for this rural Kansas town.



WATCH VIDEO

Scan to learn more about the mural.

Stat Rack

USDA August WASDE Report

225 bu./acre

projected corn yield in Illinois

32% decrease

in estimated North Carolina corn yield

1 million

additional forecast harvested soybean acres compared to 2023

SOURCE: USDA

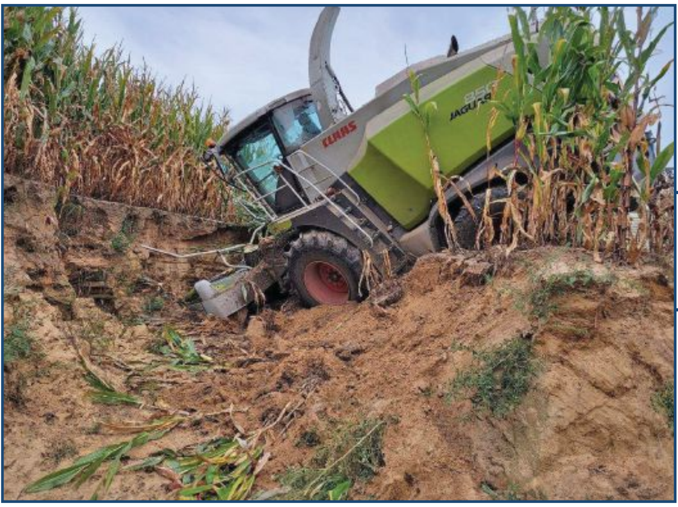


PHOTO: DENNIS PIPER

Be sure to add "watch for sink hole" to your list while cutting corn silage.

WHAT A DAY!

IF YOU'VE HAD ONE OF THOSE DAYS or captured someone else's, we'd love to share it with our readers. Email images to ***whataday@farmjournal.com***

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PHOTO: U.S. FARM REPORT

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